

FIRST LOOK! TAMIYA 414X—ALL-NEW 2-BELT TOURING CAR

RADIO CONTROL

car action

THE WORLD'S LEADING R/C CAR MAGAZINE

47380

XXX-RATED RACER

EXCLUSIVE

**Team Losi
reinvents
the buggy**

**The inside
story—pg. 64**



ALSO REVIEWED SCHUMACHER NITRO SST

- **KYOSHO SUPERTEN COMPETITION III**
- **TAMIYA GT-ONE TOYOTA TS-02 • HITEC LYNX 3D**

HOW TO Damping dynamics • Body-trimming tips



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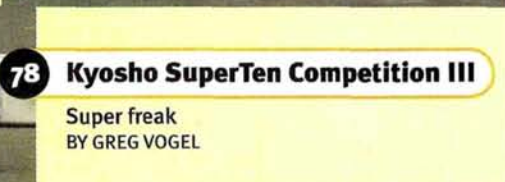
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ON THE COVER: Team Losi's radical new
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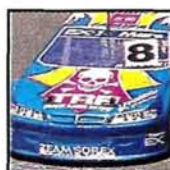
Top Secret ...

... well, it was top secret until now! I speak of Team Losi's new buggy (you can't miss it; it's the big blue one on the cover), which is no doubt already setting off a firestorm of Web postings and chat-room missives as your fellow readers pop this issue out of the polybag.



We're pleased to present our **"Exclusive: Team Losi Triple-X,"** which is probably the hottest scoop the industry will see until 2000.

While Team Losi's Double-X replacement is the biggest new-kit news, it isn't the *only* new-kit news. We reeled in a late-breaking whopper from Tamiya when the industry titan revealed plans to release an all-new competition touring car and showed us a fresh-from-the-engineering-department prototype. The **Tamiya TRF 414X** made its debut at the Reedy Touring Car Race of Champions, and you can see it here first.



Well-traveled senior editor Steve Pond saw a whole bunch of stuff first at the Shizuoka Hobby Show in Japan and snapped plenty of photos to



prove it. You'll see it all in the **"Shizuoka Show Inside Scoop Special"**: Cross Racing's F-01 Prototype F1 car, Kyosho's MP-6 Sport, Yokomo's MR-4 MT monster truck, and a lot more!

I can't put this month's "Starting Line" to bed without mentioning our new logo, skillfully designed by art director Betty Nero. Looks awesome, Betty! I'm glad you didn't listen to Chris Chianelli's suggestion that the "O" in "Action" be replaced with a shot of his head. I think it would've scared people.

See you in 30.

Peter Vieira

Peter Vieira
Editor

EDITORIAL

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Assistant Editor GREG VOGEL
Editorial Coordinator DANA DONIA
Editorial Assistant MELISSA L. TOOTHILL

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radio control
Nitro
THE ULTIMATE IN HIGH-SPEED EXCITEMENT

EXPLOSIVE SPECIAL ISSUE ON THE WAY!

Attention nitro fans! Senior editor Steve Pond is hard at work on our next special issue, *Radio Control Nitro—the Ultimate in High-Speed Excitement*. This will definitely be the source for

all things nitro powered and will include how-to articles, product reviews, tuning tips, vehicle guides ... tons o' stuff. With an acknowledged gas master such as Steve at the helm, it's definitely gonna rock!

Champ Change

Could you please tell me how to make my Tamiya Baja Champ go as fast as possible? It's stock except for a DuraTrax Spike speed control. I also have a Tamiya Chevy S-10, and I would like to know how to make it fast, too. It's also stock except for a Power Pulse ESC by Dynamite. Your mag is the best! [email] NICK

Nick, I read the email that you sent me, and Steve, Greg and Chris all forwarded the copies you sent to them! They knew I was your man because I had just finished building a "Project" Baja Champ (see this very issue; are you stoked?). But you don't have to go as crazy as I did to speed up your buggy—or any car, for that matter. Electric vehicles are easy to hop up; just add "more motor." A machine-wound modified in the 15- to 17-turn range will really bring a car to life; Trinity's Speed Gem series is probably the most popular. Try the Jade (15x4), Ruby (16x3), or Sapphire (17x1). The Jade has the highest rpm, but it will eat up your run time, particularly if you use inexpensive stick packs. I think the Sapphire is your best bet for all-around performance in the Baja Champ; ditto for the Chevy S-10. If all you care about is pure speed on pavement, you could bolt up sedan wheels and tires to your Champ, remove the rear wing for less aerodynamic drag and bolt in a really low wind (Trinity offers a 9-double Gem motor—the Zircon). However, your "sport" speed controls would probably shut down (or go "poof"), and the average 1400 or 1500mAh stick pack won't be very happy with the setup either.

—Pete

Flex Wheeler

I have an Associated RC10GT set up with a lightweight flywheel and MIP stinger exhaust. My problem is chassis flex; the truck pulls the left front wheel off the ground under acceleration. A-Main Racing offers a stiffer chassis, and R&D Racing has an A-arm motor-mount replacement. Which do you think would solve the problem better?

JOE DAVIS
Norfolk, VA

Admittedly, the stock GT tub's stiffness can be improved, and both the A-Main chassis and R&D engine/A-arm mount are excellent products, but your chassis would have to be made out of rubber to flex badly enough to lift a wheel as you describe. I suspect you have your front suspension set with zero "sag"; that means the shocks do not compress at all when the truck is just sitting still. I also suspect that when you launch the truck, the chassis wants to twist to the right. This compresses the right front shock. Because the left shock is already fully extended, there's no travel available to keep the left wheel on the ground. Remove some of those front preload spacers (or move the preload clamps up higher on the shock bodies), and your problem should be solved. For the record, flex trouble with the GT tends to affect gear mesh, not suspension action. Trinity's Kinwald TK1200 engine-mount stiffener is the best fix if you're not going to spring for the A-Main chassis. The R&D engine/arm mount is better if the goal is to bomb-proof your truck's rear end.

—Pete

Military Muddle

I just saw the "Military Muscle" feature (August 1999) and want to know more about the Fast Attack dune buggy. I am just getting started in R/C and would like this to be my first vehicle. Could you send me more information on the kit or tell me when you will have a "Thrash Test?" on it? [email] JOE WADE



I'm very sorry, Joe; I thought the article made it clear that the kit has been discontinued. You might recall reading these subtle hints that the car is no longer available: "Here's a ... machine from the hobby's early-'80s boom years"; "Unfortunately, the Fast

Attack is long out of production," and "When operating a fragile, irreplaceable car" Even though the kit is not readily available, it's still possible to obtain one; here's how. Give Radio Active Raceways (where Steve Pond found his kit) or other hobby shops a call (Radio Active's phone number is [630] 759-7557) to see if they have any old kits they are willing to sell. Another option is to visit an auction site such as eBay.com on the Web to see if a Fast Attack is being auctioned. But be warned: the kit won't be cheap, it won't perform half as well as even the most inexpensive modern buggy, and you can't get parts for it. —Greg

Best of the Best

In your opinion, which is the best electric car, motor, ESC, gas off-road stadium truck, engine for a gas truck and fuel—in the R/C world? Thank you for your help. [email] RITWICK SARKAR

According to "the R/C world's" leading experts (our readers), the best of the best (in the order you listed) are: Associated RC10B3 (off-road car), Team Losi Street Weapon (touring car) and Associated RC10L30 (pan car); Trinity D3.5 (motor); Novak Cyclone (ESC); and the O.S. Engines .12 CV (engine). Sorry, but our "Readers' Choice Awards" survey does not include a gas stadium truck or fuel category. I'm not going to pick those winners for you either because the whole point of my reply is to highlight the pointlessness of picking

"bests" for you without knowing your intentions. For instance, if you want your car to be able to back up, a Novak Cyclone is the worst ESC for you; it's

an excellent racing ESC, but it simply does not have reverse! It's entertaining to see what other hobbyists think is "the best," but to find the best stuff for you, visit your local hobby shop and let them steer you around the aisles. —Pete

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

EMAIL ADDRESSES:

Chris Chianelli: chrisc@airage.com
George Gonzalez: georgeg@airage.com
Steve Pond: stevep@airage.com
Peter Vieira: peterv@airage.com
Greg Vogel: gregv@airage.com

Jugger not Holding up

I enjoyed the review of the Tamiya Juggernaut (July issue) and was stoked when my truck arrived. Have you had problems with the bevel gears that mate with the rear differential, as I have with my Juggernaut? Can you suggest a fix? [email] RYAN FOGARTY

Actually, Ryan, a lot of people have had problems keeping those gears together. Here's Tamiya's official response; sounds as if they're working hard to help!

"Tamiya is aware that some customers have been having quality issues with the bevel gears in the differentials of their Juggernauts. In addition, running the truck with worn or damaged bevel gears may be causing premature wear on other driveline components. Tamiya has investigated the situation and will make available to our Juggernaut customers newly designed bevel gears as well as other selected driveline parts. Any U.S. Tamiya Juggernaut customer who would like to receive these new parts may contact the Tamiya America Customer Service Department at 800-TAMIYA-A and receive them at no charge as soon as they become available." —Greg

Dyed and Gone to Heaven

I really enjoyed the "How to Dye Plastic Parts" article. I had an old Traxxas TRX-1 for sale in my local shop's "used" case that wasn't getting looked at too much, so I thought I'd dress it up a bit by dyeing it blue. It came out so good, I decided to keep it! [email]

BRUCE ELLIS

The LATEST
straight from

BY STEVE POND & CHRIS CHIANELLI

There I was, once again looking forward to seeing my old friends at the Shizuoka Hobby Show in Japan, when I received an urgent communication from the Emperor. The telegram read: "To my very close friend and honorable senior editor of the most amazing magazine in the world, Chris-san.

"I understand you are once again coming to Japan. What I'm about to ask you greatly saddens me. Owing to the sushi glut we are currently experiencing in the fish market—and, of course, commensurably depressed prices—it is with the utmost sorrow that I request you send the other senior editor—the one who is 6 feet, 5 inches tall. I believe his name is, a ... Steve Pond? Yes, yes, that's it: Steve Pond.

"It is our hope that within a few days after his arrival (and two or three visits by Mr. Pond

JAPAN



A group of Shizuoka dignitaries led by S. Tamiya, president of the Tamiya Corp. (far right), greeted the thousands of eager attendees at the opening ceremonies of the 38th Annual Shizuoka Hobby Show.
"If you're happy and you know it"

to Japan's better sushi bars), sushi prices will be happily on the rise once again. Please understand Chris-san, these are desperate times that require desperate measures.

"With warmest regards,
Emperor Hirohito"

Lucky for Steve that the Emperor and I are such good friends. How could I say no?

CROSS RACING

Kyosho SuperTen/Saito FA30SC 4-stroke Conversion

Cross Racing now lends its expertise and reputation for high quality to a 4-stroke conversion for the Kyosho SuperTen using a Saito FA30SC engine. Saito is a well-respected manufacturer of superior 4-stroke engines, one of which is the FA30SC. This conversion now offers an alternative for the 4-stroke enthusiast.



TG10 Header and Tuned Pipe

This is good news for TG10 enthusiasts. Cross has introduced a custom header and tuned pipe designed to fit the Tamiya TG10. High-performance exhaust systems are less common for the TG10 because of its unconventional engine-mounting position. This new header and tuned pipe will bring the performance of the TG10 to an entirely new level by replacing the restrictive stock exhaust system.



F-01 Prototype

Cross Racing showed an F1 prototype car that it expects to offer as a production kit in the coming months. With its host of high-performance features, it's sure to take F1 performance to a new level. The front suspension features lower A-arms with adjustable upper links that allow caster and camber adjustments.

The front end's most striking feature is the inboard cantilevered shocks. The main chassis parts are made of high-quality graphite plates and were designed to accept stick packs or matched packs assembled in a side-by-side configuration. Aluminum rear bulkheads, a graphite axle, Delrin diff halves and a set of sticky Cross F1 slicks should add up to a pretty formidable package.

HIROBO

Fokker Sprint Cars

These new Fokker sprint cars bear a striking resemblance to modified, American, dirt-track sprinters. The Fokker 4WD ready-to-run includes a 2-channel radio, a battery charger and a special battery pack that allows up to 90 minutes of continuous running! If the Fokker reaches the States, it will probably tip the price scales at more than 300 bucks, which would hurt a bit, but it could be a nice switch to get away from the racetrack and drive a fun car for about an hour and a half!



HPI

4-Stroke Super Nitro

This HPI Super Nitro was tucked away at the back of the HPI booth but visible enough to allow us to take a picture of it. It's a standard-issue Super Nitro RS4, but it sports an O.S. FS26S-C 4-stroke engine. Though we couldn't get a great deal of information about it or HPI's intentions, the parts look refined enough for this car to be worthy of serious consideration.

Nitro RS4 2

This latest version of the Nitro RS4 is getting the benefit of designs originally penciled in for the RS4 Pro 2. The Nitro RS4 2 will include updated suspension arms that are stronger and specifically designed for a 200mm overall width. The kit will also include the 2.5mm lower chassis plate with countersunk screw holes. The new lower plate is backed up with a redesigned upper plate that makes the whole package stronger. Other features include a standard .15 pull-starter engine, a tuned muffler for improved performance and a full set of ball bearings.



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KEYENCE

A-01B Infinity

The A-01B is the latest in Keyence's line of electronic speed controls. It's a forward-only competition ESC that's designed for the rigors of any type of racing, right up to the most powerful modified motors. The Infinity model, unlike the previous versions, has no motor limit. This allows the use of ultra-hot modified motors that are sure to become more popular with the introduction of Ni-MH battery packs. The Infinity features ultra-simple setup and hassle-free current limiter and brake adjusters. No computer-programming degree required!



A-07R Reversing Speed Control

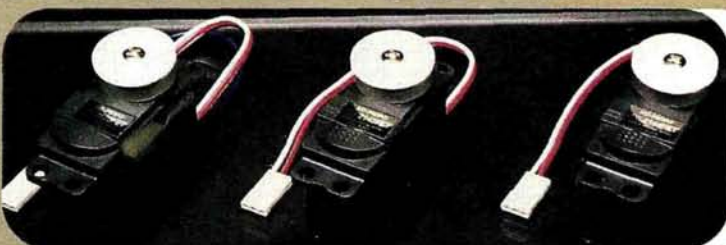
Keyence revealed the prototype A-07R reversing speed control, which, according to Keyence, features a lower on-resistance than any reversing

speed control and has no fewer than 24 micro-transistors to handle the power management. Its small size is the result of a triple-deck circuit board—an industry first.

KO PROPO

KSC-1200F Electronic Speed Control

This is KO's latest ESC aimed at the competition market. The 1200 features forward-only operation that should make it legal for all sanctioned races. Dedicating all of the transistors to forward operation allows much greater efficiency and power-handling capacity. The 1200 is reportedly designed to handle even the hottest modifieds and has a peak capacity of 1200 amps. It features solder lugs for easy wire replacement, and an aluminum heat sink keeps operating temperatures to a minimum. A booster lead for powering KO's ultra-powerful, FET-boosted servos and the innovative one-button setup feature are also part of the package.



New Servos

KO is ready to introduce a new line of high-performance servos that includes the PDS 2123FET, which is powered by an FET booster lead to exact maximum performance. Also in this new lineup are the internally FET-boosted PDS 2143FET and a 2144FET. These servos are more suitable for nitro applications and for those of us who don't want to hassle with a booster lead. Though specifications aren't yet available, KO assures us that these new units will offer noticeable performance improvements.

FABULOUS ONE

REEDY SEDAN RACE

RIPON RACEWAY

BARRY BAKER

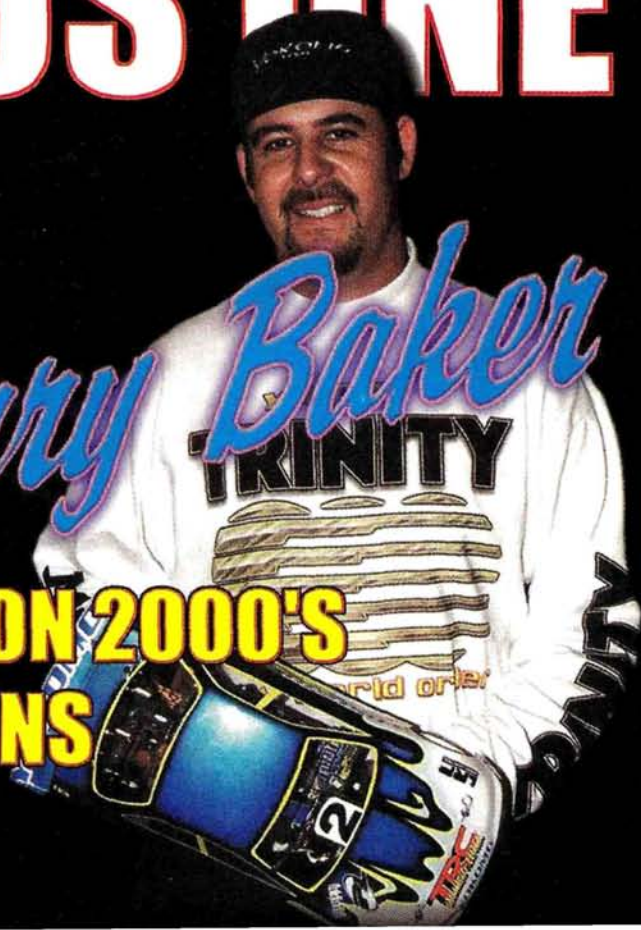
D3.5 MODIFIED

VIS EX-TRA TEAM EDITION 2000'S

A PERFECT SCORE, 6 WINS

FIRST PLACE OVERALL!

Barry Baker



KYOSHO

Fantom 2001 Prototype

One-eighth-scale racing seems to be benefiting from the nitro boom. The Kyosho Fantom 2001 is the latest in a flurry of the supreme 1/8 on-road machines. The Fantom looks as if it will be campaigned in the 1999 IFMAR World Championships in France. It has all the trappings of a competitive 1/8 on-road car, with a solid rear axle and a front, one-way diff, quick-change wheels, a carbon upper deck, a durable 4 or 5mm aluminum lower plate, a 3-belt drive system and a 2-speed transmission.



Pure Ten Viper

With the latest version of the Pure Ten, which has a Viper GTS-R body, Kyosho is going for the "American iron" look. The Pure Ten comes with Kyosho's GS11R pull-start, ball-bearing-equipped engine, fully independent suspension with oil-filled coil-over shocks, a durable 3-belt drive system, strong and thermally

efficient aluminum upper and lower chassis plates and a 75cc quick-fill fuel tank—just a few of its features. Now the Pure Ten has the added appeal of the venerable Le Mans-winning Viper body on its side as well.



TF-4 Type-R

It looks as if Kyosho is raising the bar again with its TF series touring car. Just around the corner is a TF-4 Type-R that will be a worthy successor to the TF-3. We noted a few subtle changes, including a new carbon upper deck, a rear bulkhead, a new transponder mount and rear hub carriers. The new car also looks as if it will include holders for both saddle- and stick-type packs, hardened lower suspension arms and a full set of universal-joint drive shafts. There are sure to be other refinements that we missed, but there is no doubt that the TF car will reach new levels of performance.



Dual-rate Springs

Kyosho has introduced a new concept in dual-rate springs for touring cars: a set of half-height springs that can be combined in different ways to allow the most precise spring tuning ever available. Dual-rate springs allow finer spring rates on the lower half of the spring to cope with the little ripples in the track, and the heavier spring rates cope with the larger bumps. The result is better all-around handling over a wider variety of surfaces.

Nine springs can be combined for a total of 36 spring rates.



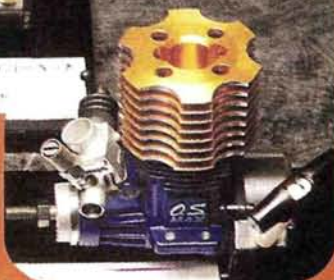
MP-6 Sports

Kyosho has introduced the successor to its popular Inferno DXII: the new MP-6 Sports—Kyosho's latest entry in the world of 1/8 off-road buggy racing. This low-cost version of the renowned MP-6 International brings Kyosho's low-cost racer up to date with the most current suspension and chassis geometry. The Sports includes all of the high-speed essentials such as aluminum coil-over shocks, a kick-up chassis plate, heavy-duty gear diffs and double steel disk brakes—just to name a few of its goodies. The Sports has been spared the cost-is-no-object features found on Kyosho's more expensive buggies, and that should give it the best bang for the buck in the Kyosho lineup.

O.S. ENGINES

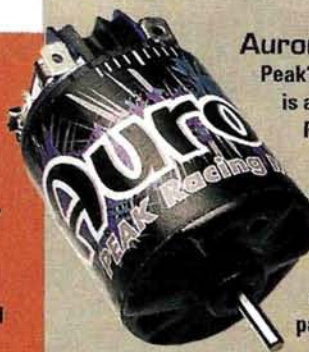
.12 and .15 Hyper Engines

O.S. surprised everyone at the show with the introduction of the Hyper CV engines. They're based on the same design as the original CV engines, but they include a specially machined, high-performance cylinder head and a 10A slide carburetor. The head is designed for better combustion and improved cooling, and the slide carb provides more precise throttle control and better punch out of the corners.



Aurora Modified Motor

Peak's Aurora modified motor, built in a TOP can, is another new product from Peak Performance. The Aurora features a well-ventilated can for proper cooling. It also includes a strong composite endbell with blue-anodized, aluminum-brush-hood heat sinks, brush vibration dampers and heat sinks for the brush shunts. A rebuildable stock motor is also part of the plans for the new Aurora line.



PEAK PERFORMANCE

3000mAh Ni-MH Batteries

Peak Performance has joined forces with Team Orion to introduce a Peak Performance version of the TOP 3000mAh Ni-MH cells. The Peak Performance cells will be available in matched racing packs that will be subjected to the same rigorous Power Flo process as Peak's current cells. Prices are anticipated to be the same as the current 2000 Ni-Cd cells.



RACY TG10 Performance Parts

Racy—one of Japan's newest hop-up houses—has introduced a new line of performance parts for the Tamiya TG10. Its lineup includes the following durable and attractive blue-anodized aluminum components: a lightweight and rigid lower chassis plate with countersunk screw holes; steering bellcranks; pivot-pin braces for the front and rear; front and rear hubs and hub carriers; heat-sink engine

mounts; lightweight flywheel; high-performance cylinder head; 2-speed transmission; and other, smaller accessories for tricking out your TG10.



TG10 4-stroke Conversion

The growing popularity of the Tamiya TG10 and the O.S. FS26S-C 4-stroke car engine are undoubtedly the motivation behind Racy's introduction of this new TG10 4-stroke conversion kit. The kit includes special aluminum engine mounts, a clutch pilot shaft, a heavy-duty racing clutch, 2-speed transmission and an exhaust coupling. The massive torque of the FS26S-C and the relatively compact size of the TG10 should deliver impressive performance.



TAMIYA

Blitzer Beetle and Ford Aeromax Metallic Edition

Tamiya may offer a limited-edition Metallic version of the Blitzer Beetle and the Ford Aeromax truck. The Metallic editions are the same as the original kits but have an added body shell that is plated in a beautiful tinted chrome. Tamiya plans to produce only a limited number of the "Metallic" vehicles, so get 'em while you can.



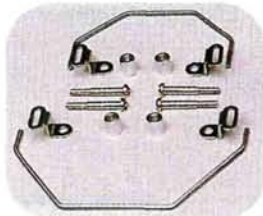
1/35-scale R/C Tank

The newest piece of military hardware from Tamiya is this 1/35-scale M1A1 tank. It's available both as a kit and as a ready-to-kill version with a 2-channel radio system. It features the same proportional control as the 1/16-scale R/C tanks in a package that is small enough to pilot around the office or home without doing too much damage (unless Pete V. drives it!).



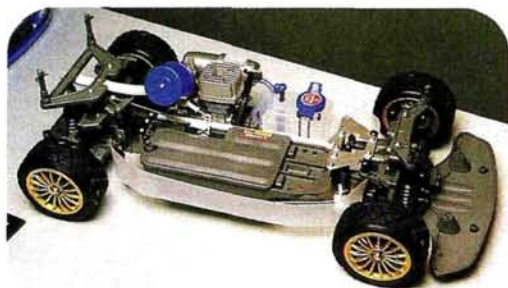
M04 Stabilizer Set

The new M04 has barely hit the shelves, but Tamiya is already putting out some go-fast stuff for high-performance enthusiasts. The stabilizer set helps keep the new M04 running flat under strong cornering forces. The stabilizer set includes all the necessary installation hardware.



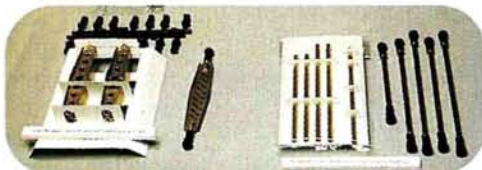
TGX Subaru WRC '99 Rally

Tamiya's TGX nitro chassis is the foundation for the new Subaru Impreza WRC '99 rally car. The TGX has been modified with aggressive rally tires and a vacuum-formed undertray to keep out the dirt and debris that you're bound to encounter in rally racing. The GTX's sealed radio box and low-maintenance shaft drive make it especially suited to rally racing, and a wet-type canister air filter protects the engine from being fouled with dirt. An FS-15LT pull-starter engine and a super-scale body that features a big roof ventilator to duplicate the '99 model factory rally car are included.

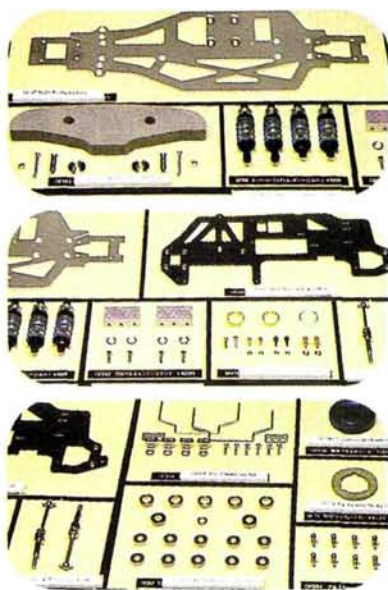


Juggernaut Hop-Ups

Tamiya is already planning a line of factory hop-up parts for the recently released Juggernaut monster truck. The first items planned include gold-anodized suspension links and a full set of aluminum tubes (anodized in the same color, of course) to replace the stock tie rods. These lustrous, gold-anodized pieces add that custom look that is so popular with the monster truck set.



TAMIYA



TG10 Optional Parts

Tamiya has introduced a line of premium-quality, factory hop-up parts for its increasingly popular TG10 nitro-powered touring car. A special aluminum lower plate with countersunk screw holes and recesses for the front and rear bumpers, graphite upper plate, front and rear stabilizer set, high-performance brake disk, universal drive shafts, heat-sink engine mounts, urethane foam front bumper and light-weight aluminum flywheel are just some of the upgrades that will be available shortly for the TG10.



M04 Chassis

It wasn't too long ago that we had our first look at the then new M03 mini chassis. Well, the folks at Tamiya have not been sitting on their hands. The all-new M04 is about to hit the hobby-shop shelves, and it will probably be available with the new Honda S2000, Lexus IS 200, or BMW Z3 Roadster bodies. The new M04 is a mid-motor design like the M03, but the motor is toward the rear for better weight distribution and handling.



1/8-scale Nitro Mini Cooper

The popular Mini Cooper is now available with the excitement and speed of a nitro-powered engine! The exquisitely detailed body sits atop the TG10 chassis, which is normally host to a 1/10-scale body. The Mini Cooper's smallness combined with the TG10 chassis technically makes this an

1/8-scale body. A special set of wheels enhances the scale appearance.

TEAM ATLAS

PureTen Hop-Ups

Kyosho's popular PureTen gets the treatment from Team Atlas with one of Japan's largest lineups of high-performance, aftermarket parts, most of which were highlighted on the display car at the show. Features include an aluminum lower plate with countersunk screw holes, graphite upper plate and rear brace, aluminum center bulkheads, special shocks, graphite shock towers and specially machined lower suspension arms. These should add some fire to the already potent PureTen.



YM-34 Touring Car

After spending years making other cars better, Atlas has decided to join the fray by making its own car from the ground up; the YM-34 is the result. It has all of the trappings of a competition touring car with the cost-no-object look of quality that Atlas has offered on other vehicles for a long time. The 2-belt YM-34 benefits from a centered motor that sits over a roomy graphite lower chassis plate. A graphite upper plate and shock towers are joined using beautifully machined aluminum bulkheads. Ultra-long suspension arms are damped by high-quality, aluminum coil-overs. Add in the frankenbuckle tie rods, and you have what appears to be a top-level touring car.



TEAM ORION

TOP 3000mAh Ni-MH Batteries

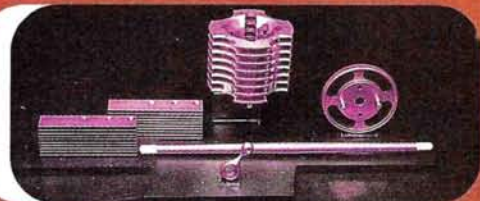
On the heels of the release of the Panasonic 3000 Ni-MH batteries, Team Orion has released its own 3000mAh Ni-MH cells. Orion anticipates that these cells will be available as the standard, 6-cell, assembled sport packs as well as the matched, high-performance packs. The price of these new batteries is anticipated to be the same as the current prices of the 2000mAh Ni-Cd packs.



TOP Chrome Motors

Team Orion debuted its new TOP Chrome series of motors. This new motor design for Orion will cover every class of racing from sealed-endbell stock motors right up to the hot modifieds. A rebuildable stock motor is also included in the lineup, which should be available for the U.S. market shortly. Every motor features a chrome-plated can with the latest in magnet technology. The composite endbell features purple-anodized, aluminum-brush-hood heat sinks, brush-vibration dampers and additional heat sinks for the brush shunts. Though we didn't get a look at the armature design, Team Orion promises that these motors will outperform its previous motors.





TG10 Hop-ups

Tobee's line of accessories extends to Tamiya's new nitro-powered TG10 and now includes high-quality aluminum parts such as a lightweight, high-performance cylinder head, drive shaft and flywheel, heat-sink engine mounts and a machined carb adapter. All of the parts in Tobee's TG10 lineup are purple-anodized for a strong, custom look.

TOBEE



M03 Hop-Ups

Tobee—one of Japan's best-kept secrets—manufactures high-quality aftermarket parts for Tamiya and other cars. Its new parts lineup

features accessories for the Tamiya M03, including a front shock-tower brace set, special servo mounts, aluminum oil-filled coil-over shocks and fixed, aluminum upper links for the front and rear suspension—to name just a few.

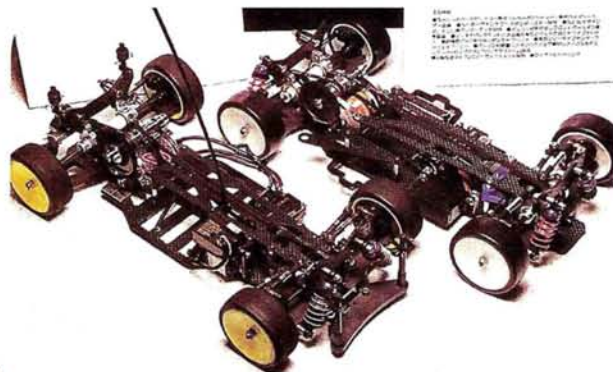


TECH RACING



One-Way Front Differential

Tech Racing now offers precision-machined, front one-way differentials for some of the most popular touring cars. They feature a durable aluminum housing with a pair of high-quality, one-way bearings and steel outdrives. These one-way units offer more precise handling and improved wear as a result of their double one-way bearings.



HR-4 Touring Car

Tech Racing, best known in the States as the manufacturer of the Tech Voggerd touring car, has introduced its latest model, the HR-4—virtually a total

redesign that features ultra-long suspension arms and wider spacing between the bulkheads to center the motor in the chassis. It includes Delrin diff halves and outdrives with retainers that prevent them from being deformed under heavy loads. Universal drive shafts, high-quality aluminum shocks and a full complement of graphite, aluminum and other exotic materials add

up to a pretty impressive package.

Two chassis configurations are available: one to accept standard stick packs and—for hardcore racers—one for saddle-type packs.

The HR-4 looks to be a cost-no-object flagship for Tech Racing, and its price backs that up. In Japan, the HR-4 sets you back 55,000 yen, which is roughly equivalent to \$450 U.S.—certainly one of the more expensive touring cars, but as the saying goes, speed costs money

F103RS Graphite Chassis

Tech Racing offers graphite lower chassis and pod plates for Tamiya's popular F103RS chassis. These replacement pieces are stiffer and more durable than the standard fiberglass chassis. The components are made of the same high-grade graphite as is used in Tech's flagship HR-4 chassis.



MR-4BC

The new MR-4BC 4WD off-road buggy is Yokomo's latest offering to be based on the chassis that has been so successful in the MR-4TC touring car. Like the TC and the MR-4 Rally, it features a molded tub chassis with molded bulkheads and shock towers at each end, a 2-belt drive system protected by the chassis' backbone and a clear Lexan shield that allows quick inspection of the front drive belt. The sealed drive system should be a very welcome feature to off-road racers, as it prevents the drive system from being fouled by debris.

YOKOMO



MR-4 MT

Would any vehicle lineup be complete without a truck? The MR-4MT rounds out the new line of competition-quality vehicles for Yokomo. It's based on the chassis design of Yokomo's MR-4BC, but modifications were obviously needed to add the big truck tires. The MR-4MT is also 4WD for improved handling. Much like the other MR-4 variants, the MR-4MT includes a molded tub chassis, a sealed, 2-belt drive train and molded shock towers. Aluminum-body coil-over shocks and a set of truck-size meats are included.



The addresses of the companies featured in this special "Inside Scoop" are listed alphabetically in the Index of Manufacturers on page 209.

DURATRAX

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Win a \$500 gift certificate from DuraTrax!

Send a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we choose to feature your creation, you'll receive a 6-month subscription to *R/C Car Action*, or an extension of your existing subscription. You'll also be eligible to win a \$500 gift certificate from DuraTrax in the ninth annual "Readers' Rides of the Year Contest" in the fall of 1999. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!

Oh, Canada!

Kirk Emery of Amherstview, Ontario, Canada, built this Schumacher SST '98. Beneath the hood is a Reedy modified stock motor for race days and a Trinity 17-turn Sapphire for play days. The car also has aluminum shocks and heat sink, Novak micro receiver and Ride wheels with super-narrow HPI belted slicks. Kirk controls the car via a Futaba Magnum radio with Futaba high-speed miniservo (FP-S132H). The HPI Accord body with Parma decals is a bit battle scarred, but that just gives the car character.



Claim to Fame

James Chen of Melbourne, Australia, customized his David Jun edition TAO3 with alloy wheel nuts, carbon battery deck, Eagle and Pro-Line tires, LRP F1 Bullet ESC, Deans leads and 2000mAh GM battery packs. The car is completed by a Tamiya Mercedes CLK body. Next to it is a small, die-cast model that James bought first. The TAO3 is controlled via a Futaba Magnum Jr. radio. Several well-known Australian racecar drivers, including Mark Webber and Alex Zanardi, have traded their autographs for some run time with James's R/C vehicles.

Brawlin' Buggy

Cullen Hudson of Colonial Heights, VA, says his Thunder Tiger Mirage V-Spec has a Thunder Tiger Pro 21BR-P engine and



tuned pipe. This buggy also features a JR-4721 metal-gear steering servo, Hitec 615MG throttle servo and JR 4.8V 1100mAh receiver pack. Cullen added an A-Main Racing Stiffy kit and a Megatech vent-flow flywheel. He controls it with a JR-R756 PCM radio and starts it with a custom starter box that his father made. Now, which way to the beach?

Bear Footin'

Father and son Bob and Brian Catalano of Seabrook, NH, aka "the Bob Cat racing team," built this "Bear Foot" truck over a six-month period. The ESP Clodzilla IV features a full racing chassis, ESP steering rods, wheelie bar and twin lube lower bumper with brush guard. The tranny consists of 16-tooth Robinson pinion gears, JPS billet-aluminum gear cases and Boca Ultra Seal bearings. This monster is powered by two Trinity Speed Gems Onyx 14-turn motors and a Sanyo 10-cell 2000mAh battery pack. Brian maneuvers it via a Futaba 3PDF FM radio and Novak Super Rooster ESC. Pro-Line Giant Track tires and JPS billet-aluminum rims are found on all four corners, and all these goodies are topped off with a Parma 94 Dodge Ram body.



sponsored by **DURATRAX**

Mini Miata

This HPI RS4 Mini Pro was built by Justin R. Dobesh of Pfafftown, NC. Hop-ups include graphite belt tensioner, heat-sink motor plate, swaybars, springs and foam bumper, and its electronics consist of a Novak XXL, Novak Fusion, standard servo and Kose onboard antenna. Justin uses a Futaba 3PDF radio and topped the car off with an HPI Miata body that he painted using Autographics window mask and Pactra spray cans. He uses a Trinity Midnight motor for stock racing and a Chameleon for "playing around."



Raider's Digest

Racing is not just for the young, says 61-year-old Martin "Raider" Woody of Yelm, WA. His HPI Nitro RS4 and Associated RC10GT both feature modified O.S. CVs, Paris tuned pipes and many hop-up parts. The sedan is topped off by an RS4 Nissan Skyline and features Ride radial tires, while the HPI Dodge Ram truck prowls on Pro-Line Speed Paws. As we went to press, Martin was undefeated (10 wins) with the RC10 GT at Terror Raceway in Tacoma, WA. He says he TQs and wins Mains eight out of 10 times with the HPI Nitro RS4.

Pride of the Yankees

Jimmy Lui of Brooklyn, NY, shows his love for the Bombers with this Tamiya TA02FF. Beneath the Tamiya Mustang body is a Tamiya FRP chassis, low-friction dampers, carbon-fiber gear shafts, full ball bearings, Tamiya Super slicks and wheels, a custom-made rear swaybar and a Tamiya FWD heat sink. It also features a Tempest Max ESC, Polaris receiver, Cirrus low-profile servo and a Yokomo 12D motor. Holy cow, Jimmy!

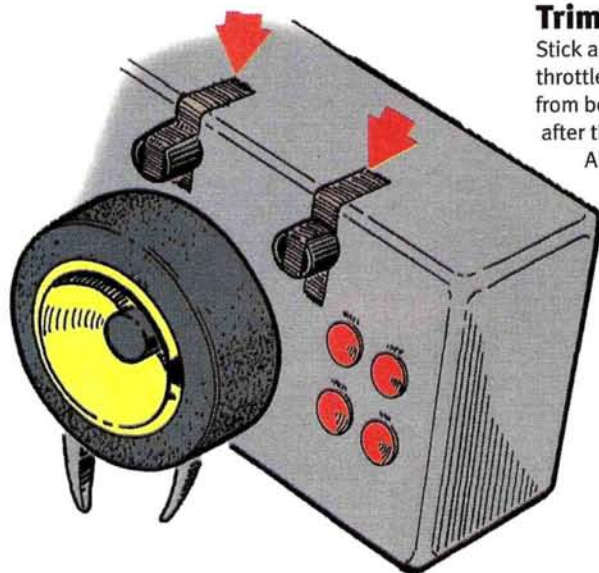


Three's Company

A racer for three years, Todd Stephan of Fort Dodge, IA, built these three cars and runs them on carpet tracks in Fort Dodge and South Sioux City, NE. The purple vehicle is a Trinity Revolver on-road chassis with Murdock racing tires, IRS rear axle, Trinity 13-turn Speed Gems motor and a Tekin ESC—all topped off by a Hot Bodies Monte Carlo. Alongside it is a custom pan car that features a Trinity Evolution chassis, Associated front end, Tekin ESC, Paradox Pro motor, Murdock racing tires, Sanyo 2000 batteries and a Protoform body. The Associated T3 truck has titanium tie rods, 1500mAh 7-cell Sanyo batteries, Pro-Line foam tires and body and LRP V6 ESC. It's powered by a Trinity Speed Gems motor. All three vehicles feature Hitec mini receivers and Hitec servos. Todd uses a Futaba 3PDF radio to drive 'em all, and he painted all the bodies using spray cans and electrical tape.

BY JIM NEWMAN

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.



Trim Fixer

Stick adhesive tape over the steering and throttle-trim knobs or levers to stop them from being accidentally moved out of position after they have been set up.

AUSTEN SMITH
Minnetonka, MN



Bingo Compound

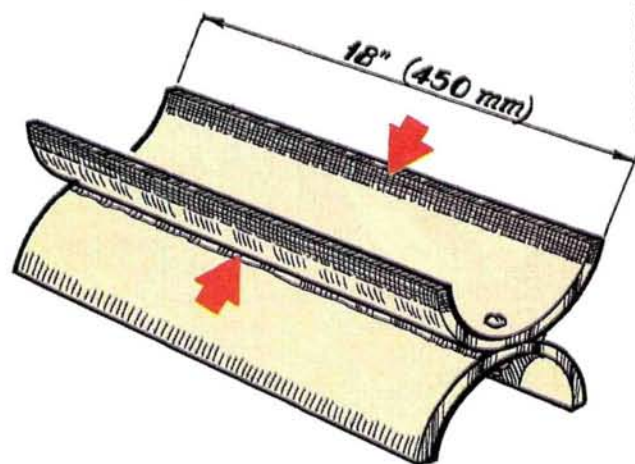
Remove the sponge cap and spring from a Bingo marker, wash the sponge and container with alcohol, then fill it with tire compound before replacing the sponge applicator. Now you can neatly apply tire compound.

ERIK NIELSEN
Midland, MI

PVC Car Stand

To easily make a car stand, saw PVC pipe down the middle, file the edges, use $\frac{3}{16}$ -inch (5mm) screws and nuts to assemble the two halves as shown, then run a bead of hot glue along the joint. Finally, cover the upper edge with duct tape or bicycle handlebar foam tape.

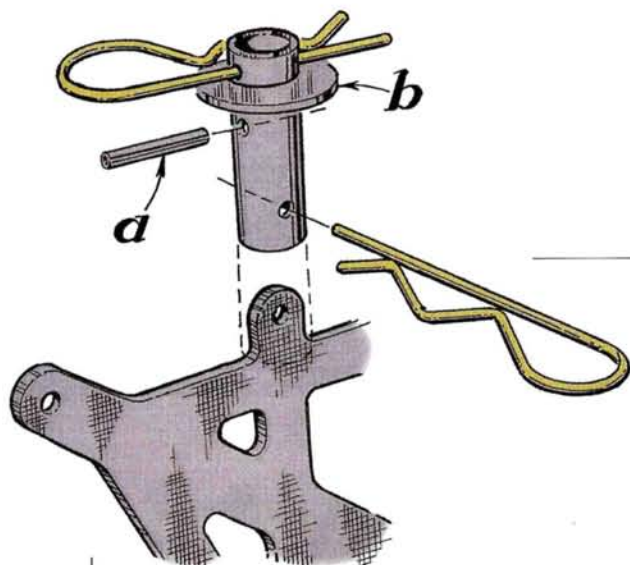
SEAN HUEBNER
Omaha, NE



Brightly Shines the Pin

Spin your hinge pins in a drill chuck, apply a smear of chrome polish with a rag, and in a few seconds, the pins will be clean and shiny.

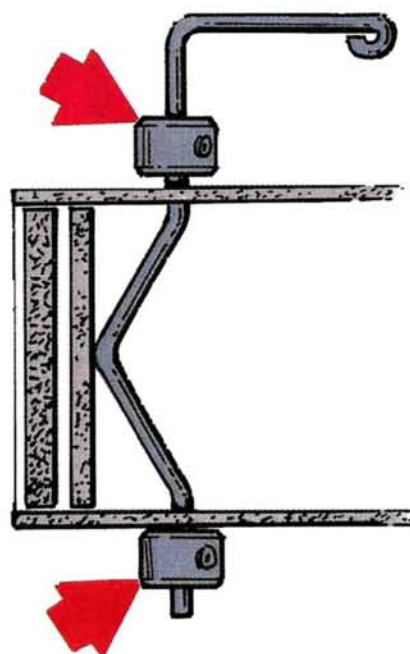
JOHN PAUL ARGENTINO
Hollywood, FL



Give it a Lift

To put an off-road body on your car, raise the shell by making taller posts from hobby-store aluminum tube, drilled as shown. A body pin secures the tube to the shock tower, and an axle pin or roll pin (a) from the hardware store supports a large washer (b). The body shell rests on the washer and is held by the usual body pin.

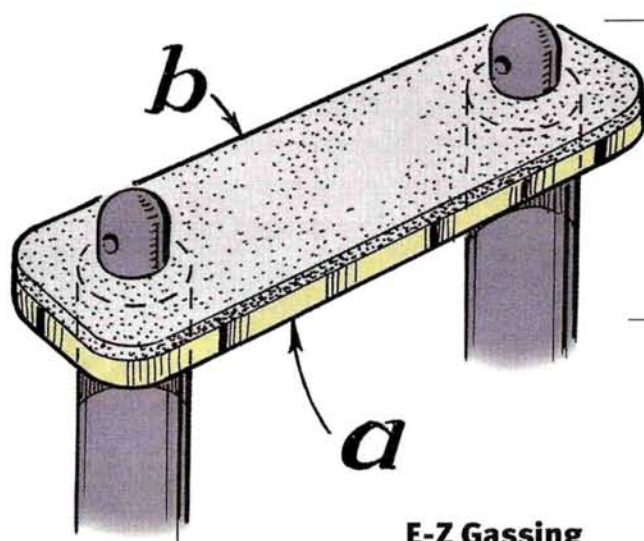
MIKE DAUER
Marietta, GA



Self-Centered RC10GT

Put a 0.075-inch wheel collar on each side of the disk-brake cam wire to keep it centered. Without the collars, the wire slips from side to side and elongates the holes, causing the brake adjustment to change.

JOHN GEORGOPOULOS
Hanover Park, IL



Support Tray

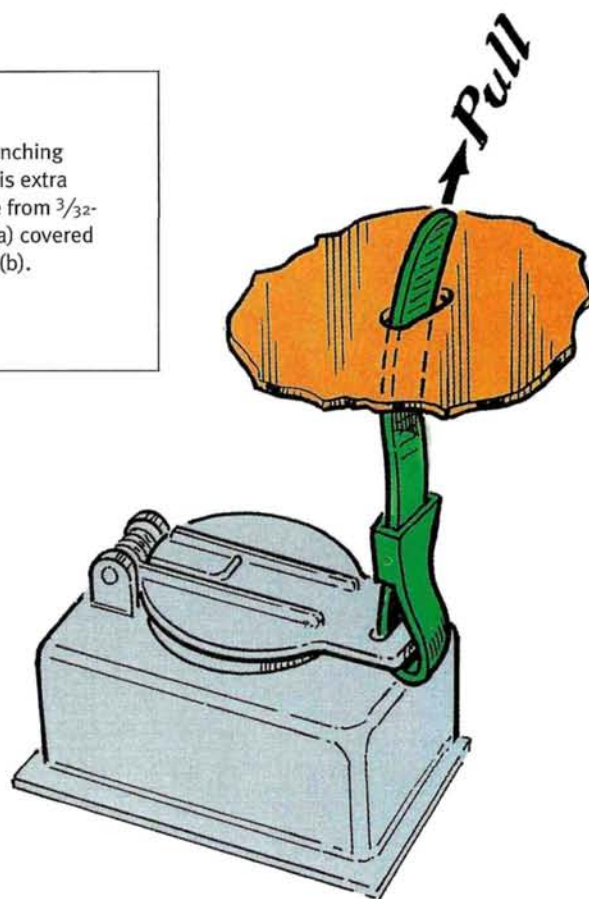
Stop body posts from punching through the shell with this extra support tray easily made from $\frac{3}{32}$ -inch (or thicker) plastic (a) covered with thin sponge rubber (b).

DAVE COWGER
Seattle, WA

E-Z Gassing

Slot your gas cap then slip a zip-tie through it. Cut an access slot in the body that allows the zip-tie "handle" to protrude. To refuel, tug on the zip-tie, then fuel through the body opening where the cylinder head or air cleaner sticks out. Keep the tie short so that the fuel cap is not pulled open in a rollover.

ED YEAGER
Thornton, CO





ROBINSON RACING PRODUCTS

TROUBLESHOOTING

BY DOUG MERTES • ILLUSTRATIONS BY JIM NEWMAN

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at *Radio Control Car Action*, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to *Troubleshooting*, *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.



Re-Tired

I have an RC10T with screw-together rims. I like these because I don't have to throw away the rims when the tires wear out, but I do have a hard time getting the tires to stay put. How can I make them stick as if they're superglued without gluing them?

ANDY ATKINS

Itaska, IL

Andy, you can glue up your tires and re-use them; just don't use CA (superglue).

Instead, use 5-minute epoxy. This will give enough extra grip to the mechanical squeeze action of the rims to hold the tires tightly, but you'll still be able to disassemble the wheel and peel off the tire without tearing off chunks. The rigid epoxy is easily picked off the slippery wheels, and any left on the tire is easily removed by flexing the rubber so it flakes off.

Extreme Results From RRP.

Richard Saxton Chooses Precision Components From **Robinson!**



Absolute Series Pinions:

Available in 48P in 16T thru 28T sizes. Super hard, lightened and cut unmatched precision. Great with any spur, but with an Absolute spur, even on-off noise is gone! RRP 1416 - RRP 1428.



Absolute Series Spurs: Available in 48P in 80T thru 91T, this is the quietest spur you can buy! RRP 1780 - RRP 1791.



RC10 GT Clutch Bells:

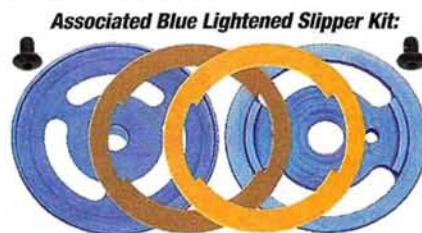
Precision machined one-at-a-time from a single piece of steel and then hardened. Fits ALL Associated and MIP shoes. (New 14T) RRP 2214 - RRP 2224.



RC10 GT Gas Spurs: Super tough and precision machined from heat resistant plastic mesh flawlessly with our Clutch Bells. 32P in 61T thru 67T. RRP 2261 - RRP 2267.

1998 World Cup and National Champion Richard Saxton:
"I only care about performance, and that's why I run Robinson Racing gears and slipper clutches exclusively."

— Richard Saxton



Associated Blue Lightened Slipper Kit:

The rear plate is hard anodized to reduce wear and the front plate is color treated. The front plate is designed to hold the slipper pad forcing the pad to slip on the rear plate. When pad shows sign of wear just flip it over for a new surface. Metal parts are CNC machined for a flawless fit. RRP 1515.



Titanium Stealth Top Shaft: CNC Machined from a single piece of titanium, this super hard, super light shaft will fit any Stealth transmission. No serious r should do without this part. RRP 1512.

"Turn to Robinson Racing when compromise is out of the question."



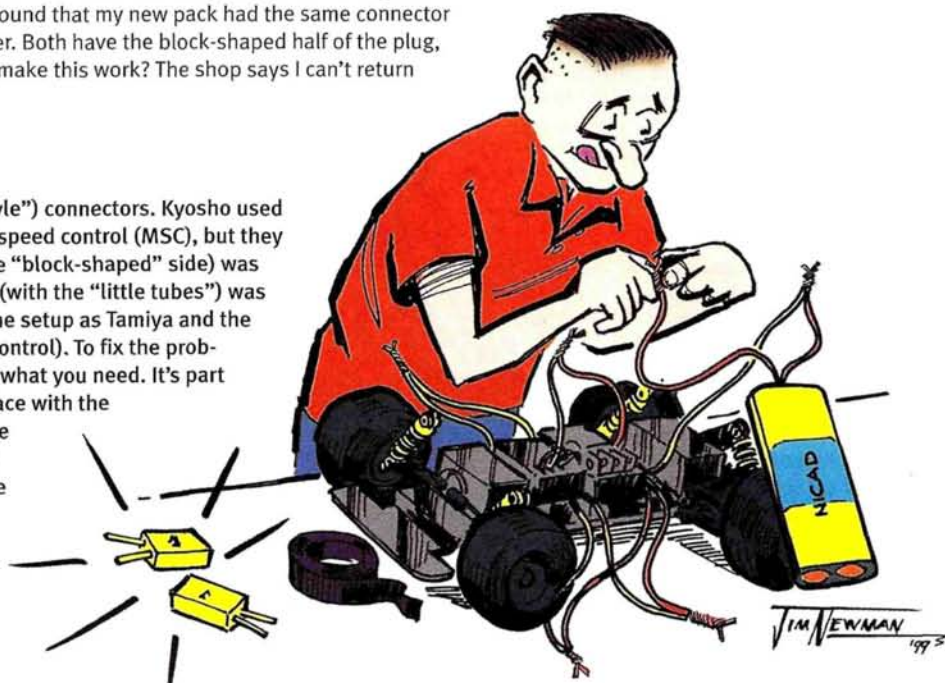
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Voice 209.966.2465 • Fax 209.966.5937 • www.robinsonracing.com

Get Connected

I recently purchased a Kyosho Ultima at a flea market. All it needed was batteries, so I bought a stick pack at the hobby shop. When I got home, I found that my new pack had the same connector as the speed control, and they wouldn't fit together. Both have the block-shaped half of the plug, but I need the half with the little tubes. How can I make this work? The shop says I can't return electrical items.

HENRY WORTH
Youngstown, OH

You're referring to JST (also known as "Tamiya-style") connectors. Kyosho used the same type on the Ultima's 3-step mechanical speed control (MSC), but they were "backward"; the female side of the plug (the "block-shaped" side) was attached to the speed control, and the male plug (with the "little tubes") was attached to the battery. Kyosho now uses the same setup as Tamiya and the rest of the industry (female battery, male speed control). To fix the problem, you need to buy an adapter; DuraTrax* sells what you need. It's part no. DTXC2200, and it has two male ends to interface with the female battery and MSC. You could also rewire the pack or speed control with a male connector, but that's a hassle. The connector will allow you some flexibility; if you upgrade to a sport-type electronic speed control, it will be set up with a male connector to match your pack, and you can simply disconnect the adapter instead of facing another plug dilemma.



Extreme Performance For You.

New, Performance Accessories For Your Racing Machines!



HPI RS4 Diff Pulleys: Precision machined, hard anodized aluminum diff pulleys. RRP 1539 fits HPI Nitro sedans. RRP 1528 fits HPI electric sedans.



RC10GT Diff Gear: Hard anodized, precision machined aluminum diff gear. RRP 1513.



RS4 Nitro 32 Pitch Conversion Kit: The slightly finer (than stock) pitch allows for more gear ratios. All components are precision machined for smooth and efficient performance. 17T hardened bell is precision cut from solid stock. RRP 1536.



HPI SuperLite™ Purple Aluminum Sedan Pinions: They're lightened, hard coated and precision cut. Available in 48P in 16T thru 28T, and 64P in 24T thru 38T. RRP 30XX (48P) and RRP 31XX (64P). Only \$5.25.



HPI RS4 Nitro Small Drive Pulleys: Precision machined and hard anodized aluminum drive pulleys. RRP 1538.



HPI RS4 Top Shaft Pulley: One piece pulley and shaft are precision cut and hard anodized. Purple anodized side flanges are pressed on. RRP 1527.



1998 ROAR On-Road National Champ John McIntosh:

"Robinson Racing Products give me a definite competitive edge — that's why I run them."

— John R. McIntosh II

"For over a decade, Robinson Racing has brought you, the racer, the highest performing gears and accessories available for RC racing."

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RRP

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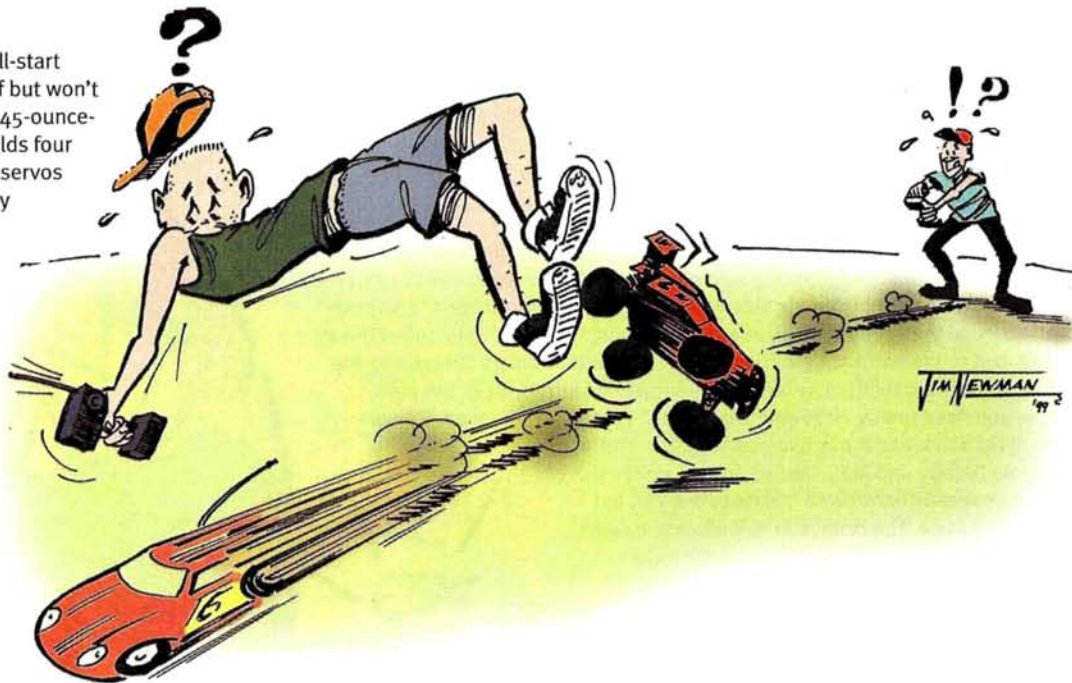
TROUBLESHOOTING

Bum Steer

I have an OFNA HODR LX with a Force pull-start engine. When I fire it up, the car takes off but won't steer. I use a Futaba Magnum radio with 45-ounce-torque servos and a battery pack that holds four AA batteries. Should I use higher torque servos with a Ni-Cd battery pack for this car? Any suggestions? Thanks. [email]

STEVE HAGER

I'm assuming that when you say the car "won't steer," you mean that the receiver and transmitter work correctly, but there isn't enough strength in the servos to do the job. First, let's consider the servos' power source. If you use four AA Ni-Cd cells to power your servos, they get only 4.8 volts (1.2 volts per cell). If you switch to alkaline cells, which produce 1.5 volts per cell, a total of 6 volts will power the servos, and you'll notice an immediate improvement. However, you'll also be throwing money away on disposable batteries. Your best bet is a 5-cell Ni-Cd receiver pack; it will give you a full 6 volts *plus* the benefit of rechargeability. But I suspect your car still won't steer well; 45-ounce servos simply aren't strong enough. Gas racers who run Futaba equipment seem to like the speed and strength of the 9304 servo for both steering and throttle. They're not inexpensive (their street price is around \$60), but these servos have plenty of strength to turn the wheels, even in tight turns and at low speed.



Mr. Wiggly

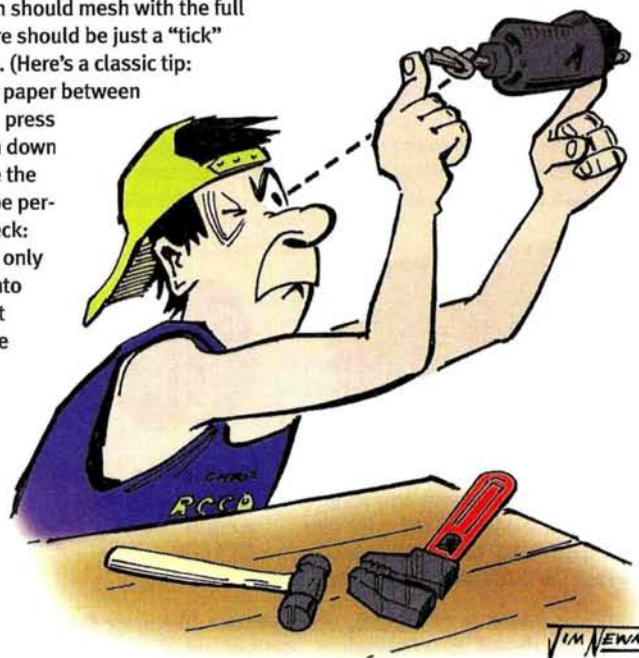
I'm a two-year subscriber to your magazine, and it rocks! Lately, I've had a problem with my Team Associated T2 truck. It seems I have to replace the spur gear every week! I use Associated spurs and Robinson and Trinity pinion gears, but after only three or four runs, the plastic gear starts to look all chewed up on one edge. Pretty soon, the rest of the gear starts to look nasty, and then it fails completely. I've used the same motor for a long time, so I know that's not the problem. What am I doing wrong? How can I stop needing to buy new gears so often?

ANDREW KLATZMAN
Colorado Springs, CO

Maybe your motor *is* the problem, Andrew, but first, let's get the obvious out of the way: always use a gear cover when you run any off-road vehicle. The dust, gravel and dirt that get between exposed gears will grind any spur to dust during a few runs. Contamination does not seem to be your problem, however, so let's move on. Check the top shaft in the tray to see if it is bent, and check the top shaft's output bearing for excessive play. If either has gone bad, replace them. Next, check the motor output shaft to make sure that it isn't bent. A wobbly, wiggly motor output shaft can cause the condition you describe, and the shaft will bend easily if the motor is

dropped onto a hard surface. Even if the shaft is straight, worn bushings or a bad bearing can cause it to wobble. If you can't see any runout in the shaft, move on to the pinion. Is the gear mesh set properly? The full width of the pinion should mesh with the full width of the spur, and there should be just a "tick" of free play between them. (Here's a classic tip: insert a piece of notebook paper between the spur and pinion gears, press them together and tighten down the motor screws. Remove the paper, and the mesh will be perfect.) One last thing to check: armature play. You should only be able to move the arm into and out of the motor about 0.5mm. Any more, and the armature will wander in the motor and cause the pinion's alignment to shift—perhaps enough to cause your striping problem.

*Addresses are listed alphabetically in the Index of Manufacturers on page 209.



Masking and Painting Tips

The creation of the polycarbonate (Lexan) body was a major milestone in the R/C car hobby.

Because the paint is applied to the inside of the body, it's better protected and always has a high-gloss look. But there's a downside; unlike polystyrene (hard plastic) bodies, which can be sanded and refinished if you make a mess of your paint job, Lexan body shells give you only one chance to get it right; that's why masking is the most important step in painting. This month, I show you some handy ideas to help you avoid those masking mishaps, and I pass along some simple techniques that will ensure a professional-looking paint job.

CLEAN UP YOUR ACT

Before applying any masking tape, you must prep the shell for paint. To improve paint adhesion, roughen the shell's inside with 600-grit (or finer) sandpaper or a Scotch-Brite pad. The shell might look scratched, but paint will conceal this.

Don't sand "windows," as they will not have any paint to conceal the scratches; concentrate on the front and rear fenders and the areas around the wheel wells—areas that have to take the full force of impacts.

Next, wash the inside thoroughly with warm, soapy water. After you've washed it, avoid touching the inside of the body because you could leave dirt or oil from your fingers on the clean surface.

SHOW ME THE WAY

When the body is clean and dry, you're ready to start masking—windows first. I don't like to cut the masking tape directly on the body

because a mistake could leave a visible cut line; instead, I make window templates by taping tracing paper (available at drafting and craft stores) over the window on the outside of the body and then drawing the window's outline on the paper. Then I transfer the drawn outlines to the masking tape or sheet.

To make a window template, I like to use sheets of Dahms* or DuraTrax* masking material so I can draw and cut out all the window masks from one piece. To transfer the window outlines from the templates, place a piece of carbon paper (carbon side down) between the template and the masking material, and then go over the lines. Now cut out and apply your window masks, and save the templates in case you paint an identical body in the future.

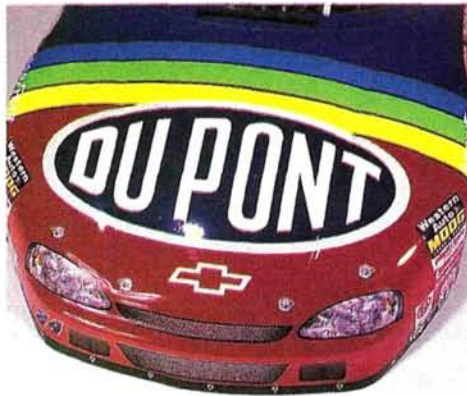
LAYOUT AND DESIGN

Painting Lexan requires an entirely different way of thinking.

You have to think inside out!



With just a little time and effort, colorful graphics packages and simple paint combos can reward you with an authentic-looking racer. Hot Bodies* Pontiac Grand Prix (10109) and Slix* decals nail this NASCAR head-on! For a sharp paint job, apply the graphics and carefully mask before painting. Just shoot basic Outlaw Black (RC250) and then Fluorescent Green (RC281).



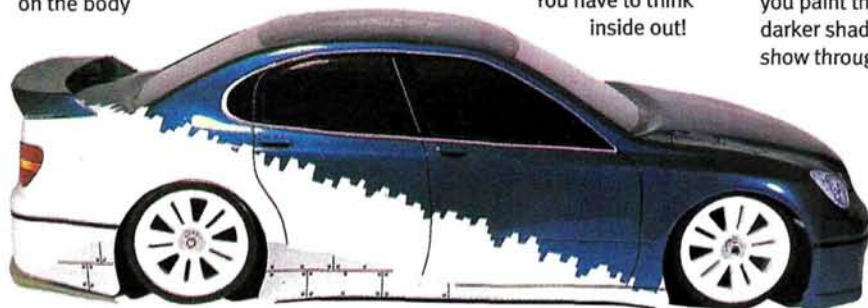
Jeff's Rainbow Warrior racecar may be duped easily with a simple two-color paint scheme. Just spray on Pactra's* Metallic Blue (part no. RC265) and a few coats of Indy Silver (RC262), then add Bright Red (RC287) and a Slix* decal set (2053/RC9824).

To ensure the best results, plan your painting project carefully. With a permanent detailing marker, lay out your paint scheme on the outside of the body so you'll be able to visualize how it will eventually look and determine which color combos to use. You can remove the marker lines later with body wash or rubbing alcohol.

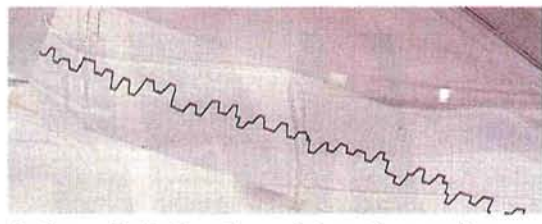
Now decide the order in which you'll apply the colors; if you can, apply the dark ones first because if you paint the light colors first, the darker shades applied later may show through. If your paint scheme

YOU'LL NEED

- High-quality 2-inch-wide masking tape or masking sheet.
- Liquid masking and brush (optional).
- Discarded computer label backing sheets (optional).
- Sharp hobby knife and spare no. 11 blades.
- 2H pencil and tracing paper.
- Rubbing alcohol.
- Nail-polish remover.
- Cotton balls and Q-Tips.



HPI's* Lexus GS 400 (7048) was the perfect candidate for some flashy paint-work. Dramatic paint contrasts can really make your car stand out! Choose your colors carefully. Time, patience and a little imagination can make this paint job happen for you!

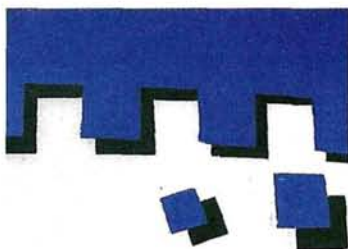


In the early design stages, I draw the graphics on tracing paper. Once the design has been refined satisfactorily, I place it on the inside of the body to help get the layout correct. This also helps me visualize how the design will eventually look.

Here's a simple trick to get a cool-looking 3D effect. Cut small identical shapes out of masking tape, place one of them on the inside of the body, then offset a second one behind it to give the illusion of depth.

The second shape will be the shadow of the shape

in front of it, creating a floating effect. Paint the main color (in this case, it's white), remove the second masked shape, apply black (for the "shadow"), remove the final masked shape and paint the secondary color (here, it's metallic blue).



is mostly light with smaller dark areas, mask off the areas that will be dark, spray on the light colors, then back them with a coat of silver or white; for example, back yellow with white or silver, and back white with silver. This combination will

ensure that the darker colors don't show through the lighter colors.

AT THE PAINT SHOP

Play it safe: always paint in a well-ventilated area and wear a paint mask to avoid inhaling paint particles.

When you're ready to paint, warm the paint can in a bowl of hot water. This helps the paint pigment and lacquer to mix, and it increases pressure in the can, which gives a more consistent paint flow.

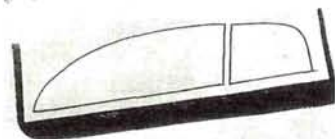
The temperature of the surface to be painted is important, too. In my experience, it should be at least 50 degrees. If you paint outside, especially when it's cold, keep the body inside until you're ready to paint. You could also warm the body with a hair dryer set on the lowest temperature.

When you've finished painting, put the body in a warm place to dry; this promotes paint adhesion and cuts drying time.

Your first coat of paint should



Making window templates is easier and cleaner than cutting the masking tape on the body. To make the template, draw the window outline pattern onto tracing paper. Holding the body up to the light will help you see the window outline.



To transfer the tracing onto a window masking sheet, place a piece of carbon paper (carbon side down) between the tracing and the masking, then go over the outline. The mask is ready to cut out. To make the mask for the opposite side, flip the tracing over and use the reverse side. Make your own masking sheet with discarded computer-label sheets. Lay 2-inch-wide masking tape on the label backing and apply your pattern.



If you have a color-separation line that is to be covered by a decal or a stripe, place photocopies of the graphics on the body to help match up the paint-division lines. With the mock-up decals in place, the masked areas are easier to lay out. You can also draw your design on the outside of the body with a permanent pen.

MORE TIPS

1 Use high-quality masking material such as DuraTrax Window Mask (DTXR1200); this is especially critical on areas where the edges have to be particularly crisp and clean.

2 If the outside of your R/C shell doesn't have a protective film covering, cover it with plastic food wrap, and protect any parts the wrap doesn't cover with masking tape. Avoid placing masking tape over graphics because it might pull them up when you remove it or leave a sticky residue on them.

3 When using liquid masking, apply it in thick coats so that it will be easier to remove (you should be able to peel it off in large pieces). Use a no. 1 brush to apply it to small areas and a no. 2 for larger ones.

4 Check all masking-tape edges. It's most likely to come away at the tightly curved areas. Watch these spots closely; inspect all masked edges twice before you apply that first coat of paint.

5 Remove paint overspray and bleed-through with rubbing alcohol, which can be purchased in 70- and 90-percent solutions; the latter works well on overspray; the former will remove tape residue but won't affect previously painted areas.

Polly S Easy Lift Off (E.L.O., part no. 542143) is another great paint remover. This stuff works great on all kinds of paints and plastics; it does an excellent job of removing 100 percent of the paint, but it doesn't attack Lexan or leave any residue.

Important: be sure to use paint strippers only in a well-ventilated area, and follow the directions closely. Be careful to avoid getting it on your paint job, and use cotton balls on large areas and Q-Tips for small jobs.

6 Clean off masking tape residue by sticking a clean piece of tape over the area and pulling it up sharply. The residue should stick to the tape and not to the body.

be light; it will seal the edges of the masking material and protect against the paint bleeding underneath it. Thick coats of paint take longer to dry and are more likely to crack or flake off the first time the body is hit. Be moderate with your paint application, and allow a minimum of 15 minutes drying time between coats. The quality of paint adhesion is related to how long it's allowed to dry between coats—the longer, the better.

UNMASKED

When you've completed your paint scheme, it's time to remove the masking. Pick up the edge of the masking with the tip of your hobby knife, then pull it up slowly,



In some cases, it may be better to apply the decals to the unpainted shell to get the perfect paint/graphics match. Once the decals have been applied, masking is much easier to do and will be more accurate.

smoothly and evenly with your fingers. Don't hurry; if you pull up the masking too fast, the masked area will have rough edges and leave excess masking-adhesive residue behind. Overspray and adhesive residue can be cleaned up with a combination of two parts nail-polish remover and one part rubbing alcohol. Never use gasoline, lacquer thinner or other harsh solvents on polycarbonate, and be careful not to get any paint thinner on previously painted body parts.

FINISH LINE

If you total the time it took you to go from fresh-out-of-the-bag body to completed, multicolored paint job, you'll find that most of your time was devoted to masking. That's good news; unlike paint, masking materials are forgiving. If you make a mistake, you can simply peel it off.

Crank up your artistic abilities! Using the basic steps discussed in this article, high-quality materials and a little patience, there's no reason you can't turn out a killer, pro-quality paint job.

**Addresses are listed alphabetically in the Index of Manufacturers on page 209.*

Make the Most of Your Car's Suspension

We tend to think of our cars' suspension systems as a means of "absorbing" bumps, but the true mission of a suspension system is simply to keep the wheels in contact with the ground as much as possible so the car always drives forward and the tires always generate traction. Since we're all tinkers at heart, we try various spring rates, oil viscosities and suspension settings to optimize the response of the car's suspension to the surface. The only way to make certain that you get the most out of all this fine-tuning is to minimize static friction in the suspension of your car. Further, you must accomplish that goal without making the suspension "sloppy" due to excessive clearance between the arms, pins and hub carriers. Follow along as I show you how to make your car's suspension able to react to the smallest surface imperfections without losing the nuances of precise tuning changes.

HANG LOOSE

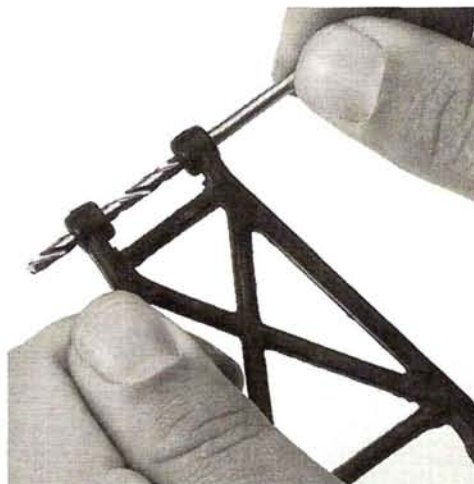
Here's the ideal: with the shocks and drive parts removed, the suspension system should be able to fall under its own weight, with no binding, yet have minimal slop and side-to-side play where the hinge pins meet the arms and mounts. But even with today's advanced molding and machining techniques, the suspensions of many new kits don't work as freely as they should right out of the box. Some folks swear that you can just slap the suspension together and allow it to loosen up with use; this is a bad idea because it eliminates your control of how the parts fit and wear. Sticky suspension movement can be caused by a bad fit in several areas, and few of these will be cured by forcing the arm to travel through its range of movement while it's binding. Even worse, you can wear out significant portions of the car's suspension and still not have a smooth, freely moving arm and upper link. I've seen cars with enough slop to require a total rebuild, yet the suspension sticks when it's fully compressed! This is exactly what you don't want to happen.

FIXES FOR TIGHT OR LOOSE HINGE PINS

Most cars call for the suspension arm to pivot on a fixed hinge pin; the arm moves on the pin, but the pin does not rotate in its mount. For the suspension to operate properly, the arm's pathway (bore) for the hinge pin must be precisely sized. If the fit is a bit tight, the arm will bind; too loose, and you'll have slop. Here's how to handle both situations:

Tight hinge-pin fit

The quick-fix technique is to run a drill bit that's exactly the same size as the hinge pin through the bore. Remember, if the bit is even slightly larger, you'll remove too much material and make the fit too loose. If you're not absolutely certain of the pin's diameter, I suggest that you buy or borrow a pair of digital calipers. Most American-made cars use an 1/8-inch pin, while



A drill bit can be used to accurately size hinge-pin holes that are too tight. Bits are available in metric and standard sizes.

POLISH FOR PERFORMANCE

Whenever I build a new car, I always polish the hinge pins and kingpins. This takes a few extra minutes, but the car will be ready to run at its best as soon as it hits the track. If you rebuild an older car, roll the pins across a flat surface (a piece of window glass or a framed picture works very well) to check for straightness. A pin that's not straight will bump up and down as it rolls across the glass. Put each straight pin in the chuck of a drill or grinding tool and spin it at slow speed. Using metal polish (Happich and Mother's are two brands that work well and are easy to find) and a shop rag, polish one end, pull the pin, reverse it and do the other end. This removes any burrs that remain from the machining process and lets the pin slide smoothly through the mating hole without gouging any nylon or plastic from the mount. While you're at it, polish all of the metal ball ends in the same way. That will allow the upper links to move as freely as the hinge pins.

Which hinge pin would you rather have in your car? A little polish can save the day here



A rotary tool (or drill), some metal polish and a rag are all it takes to put a bright and slippery finish on your hinge pins. Be careful not to tangle up the rag in the chuck.

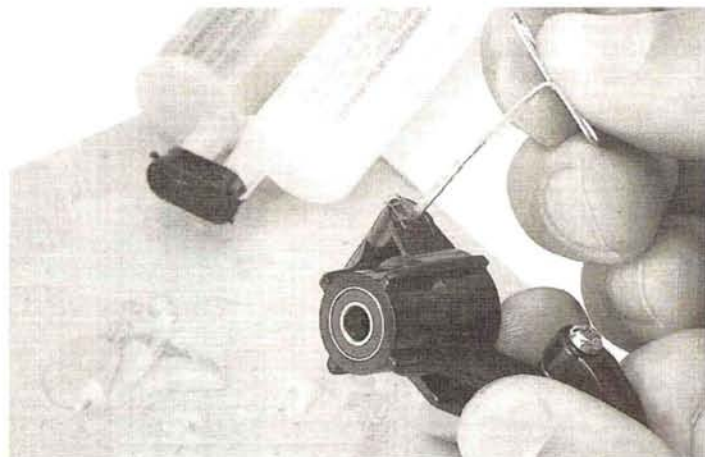
European and Japanese pins tend to be 3mm. Spin the bit by hand if you can; if you must use a drill, don't spin the bit too fast or leave it in the bore too long, because this tends to heat and distort the bore and leads to a fit that is unacceptably loose.

For the best results, use a reamer—sometimes called a rifle bore—that matches the diameter of the hinge pin. When placed in a tap handle, the sharp blades remove only as much material as is absolutely necessary to size the hole properly. Because you turn the reamer by hand, there's no way you can ruin the part with excessive rpm.

With a polished hinge pin, polished ball ends and a correctly sized pin path, you'll have a suspension arm and upper-link assembly that glides through the entire range of movement and falls under its own weight.

Loose hinge-pin fit

David Jun, Tamiya's ace sedan pilot, recommends that you drip a little slow-curing CA into the arm bore, coat the hinge pin with silicone (shock oil works very well here), place the pin in the hole and let things set and cure overnight. If applied properly, the silicone will prevent the CA from adhering to the pin, and the slow-curing nature of the glue will allow it to seep into the areas where the pin is not displacing air. I like that idea, but I prefer to use two-part epoxy glue instead of CA. In addition, I clean out the pin path with rubbing alcohol and a pipe cleaner before I begin the gluing process so the epoxy will stick to the hole's interior. Never use motor spray for this purpose, as it may attack and destroy the plastic part!



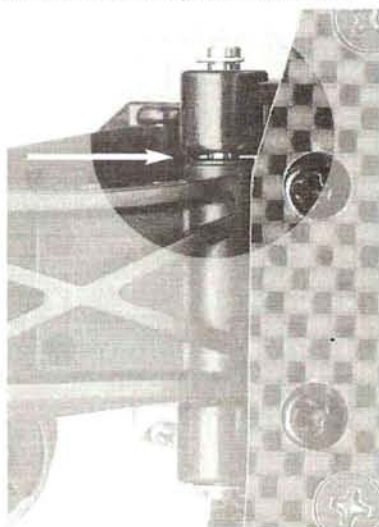
If you have any parts that wobble on the hinge pins, try coating the bore with two-part epoxy (above), and then slide the hinge pin in and allow the glue to cure overnight (left). Before sliding the pin in, lube it with shock oil to prevent the epoxy from bonding to it, and wipe any epoxy out of the E-clip slots before it sets. Once it has dried, remove the pin to reveal a perfect-size hole. It works!

FIT FLUBS

I've often found that there's an interference fit between the arm and the mount, and this can also cause the suspension to bind. To size these parts correctly, remove some of the surface of the arm where it rubs the mount. Take off just a little at a time with 300-grit sandpaper or a very sharp hobby-knife blade (be careful with those sharp blades!) until the fit is perfect.

If you overcook it, there will be a gap between the arm and its mounts, and the assembled suspension parts will slide back and forth on the pin from front to back. To correct this problem, use a thin washer that rides on the pin between the arm and the mount. It may not be easy to find washers of the proper thickness, but you can reduce the spacer's thickness by rubbing it back and forth over the same piece of 300-grit sandpaper as you used to trim the arms. Eighth-inch washers are easy to find because they are used in motors, and most good hobby shops stock them in a variety of thicknesses.

Once the clearance between the arm and mount has been taken care of, install the hub carriers and spindles, and give them the same treatment. Just as on the arms, upper links and mounts, your goal is a tight, slop-free fit that will respond to every 1/4-degree change in camber or toe-in or 10WT change in shock fluid.



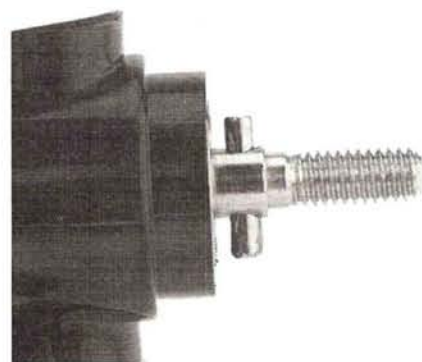
This Tamiya TA03R TRF shows a gap (arrowed) that allows the arm to float a little on the hinge pin. A 0.5mm shim will fix this in a jiffy.

CURE WHEEL WIGGLE

OK; your suspension is as smooth and as snag-free as a politician's after-dinner speech. So now it's time to slide the pins into the drive axles and bolt on the wheels, right? Well, not yet. See, there's another step to suspension perfection, and I call it "wheel wiggle."

It's not that hard to remove wheel wiggle and, in fact, it's done in the same way as you got rid of the clearance problems in the suspension. Wheel wiggle can almost always be traced to the gap between the outer bearing on the wheel hub and the drive pin that runs through the axle. The problem, of course, is that you can't just slap any old washer in there to get rid of the gap because it may rub on the bearing's outer race and cause interference. That's why it's critical to measure the size of the inner race and make sure that the spacer you use isn't any larger than that.

Yokomo* and Factory Works*, among others, make spacers intended for this purpose that are the optimum diameter for touring cars, and shims for off-road axles are readily available. If the spacer is too thick, cut it down by sanding it on one side as suggested for hinge-pin washers.



Note the gap between the crosspin and the hub face; this allows the axle to float and does not adversely affect handling precision. A shim or two will fix this problem; for touring cars, Factory Works, Yokomo and others offer shims that will slide over the axle without rubbing against the bearing seals.

FREE AT LAST!

By taking these extra steps to free up suspension movement while you are building or maintaining your sedan, you'll wind up with a chassis that responds to every small adjustment you make at the track. And as any top driver will tell you, it's the little adjustments that separate the A-main guys from the rest of the field!

**Addresses are listed alphabetically in the Index of Manufacturers on page 209.*



What's wrong with this picture? Nothing; the arms fit the bulkhead without gaps yet move freely. These parts are from an OFNA Z-10.

EXCLUSIVE

TEAM LOSI XXX PROTOTYPE

by Peter Vieira

**News
Flash!**

Triple-X sweeps
ROAR Modified Nats!
Kinwald wins; Triple-X
takes 9 out of 10
A-Main slots!

Nothing breeds innovation like racing, so it's no surprise that Team Losi*, arguably the off-road segment's most innovative brand, is also one of the staunchest competitors on the track. Ever since the JRX-2 was launched to combat Associated's original RC10, Team Losi has enjoyed great success at club races and national events alike. With the introduction of the ground-breaking

X-Factor

Double-X buggy in 1994, Team Losi redefined 2WD off-road and took the machine to its first world championship victory in 1997 when Brian Kinwald piloted a Double-X 'CR' into the record books.

That was then; this is now. Despite the continued success of the XX platform, Team Losi has decided it is time to move forward with a new buggy as it looks toward the 1999 IFMAR Worlds in Finland. We are pleased to bring you the first photos of the XXX (or "Triple-X") prototype machine, and you'll no doubt agree that Team Losi has once again pushed the envelope. If looking fast translates into being fast, then the latest Losi will be tough to catch.

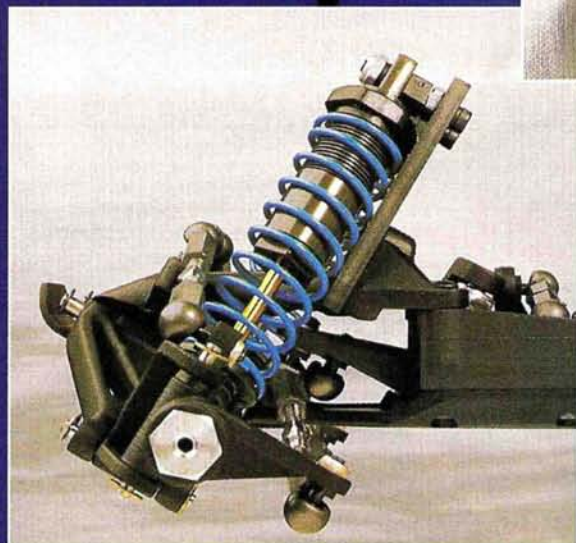
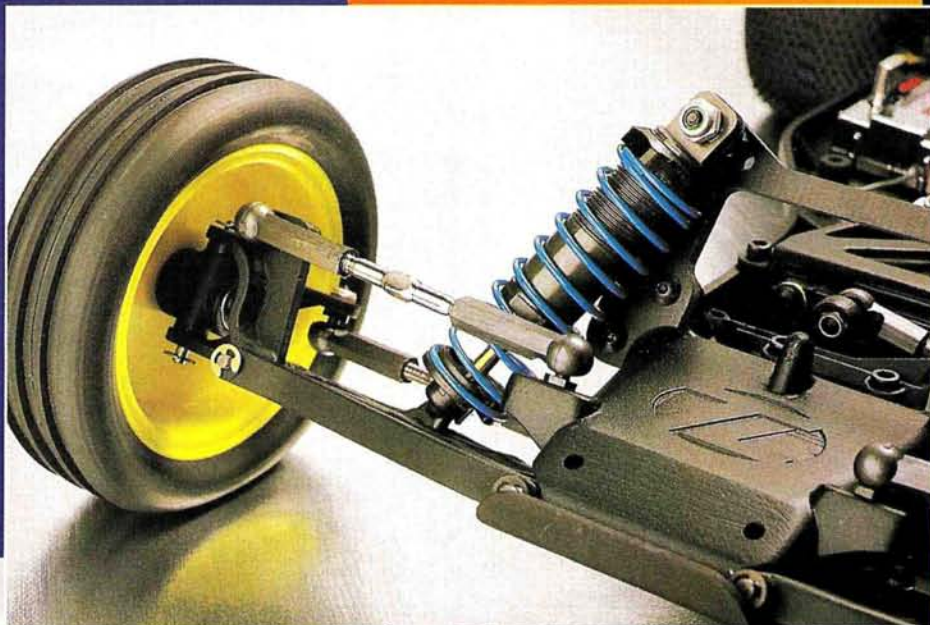


"It's awesome. I'm so stoked. The XXX just feels totally planted; it's so easy to dial in. I love it! I couldn't wait to debut the car, and to win with the car in its first official appearance is the greatest."

—Brian Kinwald,
Team Trinity/Losi

FRONT SUSPENSION

The most obvious feature of the all-new front suspension system is the placement of the camber links. Although it does seem shockingly new to place the links in front of the shocks, the camber links are actually in a perfectly normal position relative to the wheels; it is more accurate to say that the front shock tower and shocks have been moved back on the chassis than it is to say that the camber links have been moved forward. The shocks shown here feature threaded bodies but the kit will include clamp-type preload adjusters and the same race-proven hard-anodized body/bottom-loaded cartridge construction as the dampers found on the Double-X 'CR.'



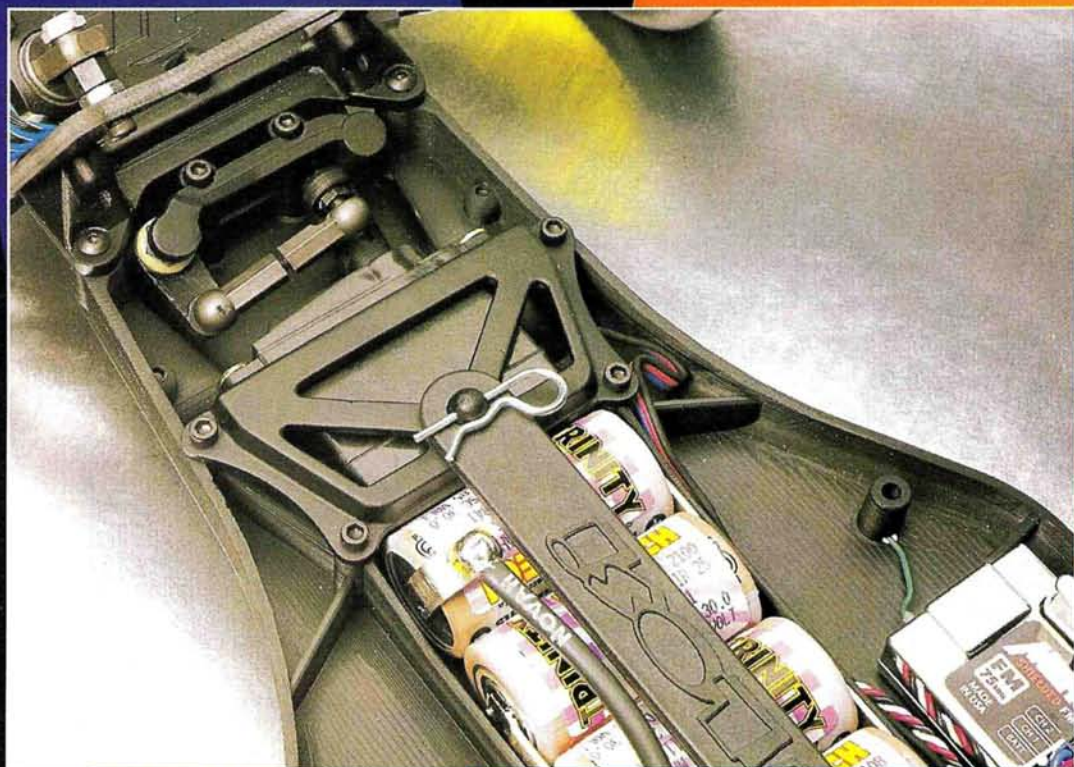
New suspension arms were designed to mount the shocks close to the rear of the arms. This helps to lower the overall height of the car, since the 30-degree kick-up angle of the arms causes their fronts (where the shock would be mounted on a typical buggy) to be higher than their rears. With lower shocks, the car's center of mass is also lowered, and this can only improve its handling. In addition, the design reduces twisting forces on the suspension arms and allows a smaller, stronger shock tower to be fitted. The front arms are identical, so there's no need to stock "lefts" and "rights" in your parts box.

New hub carriers are hung off the arms. Two positions are offered for the camber-link ball stud—no more combined kingpin/ball stud. The hub carriers have a significant offset and hold the steering knuckles well away from the hub's hinge pin. As with the Double-X series, the new car uses a trailing axle with bearings in the hub instead of in the wheel, but the new hubs use larger bearings. For an additional level of tunability, the front axles' total width can be adjusted to alter front track or compensate for wide or narrow wheels.

The new car just seems so right, so logical, that it can only be faster and easier to drive.

STEERING

Although the bellcrank steering looks fairly conventional, it is anything but. The bellcranks are angled to match the front kingpin angles. Team Losi calls this its Advanced Geometry Design (AGD) steering system, and the primary benefit is zero bump-steer, even at full lock. Two Ackerman positions are offered on the steering bellcranks, and an adjustable servo-saver is built in.



TRANSMISSION

Team Losi has not decided what the 3-gear tranny's ratio will be, but no changes are planned for the existing ball differential (with the possible exception of a different tooth count on the diff gear). The prototype's diff reaches out to the hubs via steel axles with Losi's molded universal ends. The gearbox itself is all new and incorporates a plastic motor cage (with trick "TL" logo molded in) and rear bumper. The current Double-X uses a one-piece aluminum cage, motor plate and bumper that can be tweaked in a crash; the new design isolates the motor plate from such abuse. The motor plate also holds the motor much closer to the transmission, and that shortens the car's overall length and places the motor's weight over the rear axles for optimum traction. The tranny is completed by a double-disk slipper—an innovation that debuted on the Kinwald Edition 'CR.'

CHASSIS

Team Losi pioneered molded chassis for competition off-road vehicles, and the new car's chassis represents further refinement of concepts proven by the original Double-X. Naturally, there's a molded tray to accommodate a 6-cell pack. However, the pack (along with the bottom of the chassis) is 0.100 inch lower than on the previous design. The battery tray uses a foam spacer to allow pack position to be changed by about the width of one cell. The sides of the new chassis are raised for greater cornering clearance (another original Double-X concept), but the new car favors a gently flared bottom rather than the stepped bottom used by its predecessor. Up top, a single brace passes over the servo and serves as the attachment point for the battery strap, and this allows the servo to butt right up against the battery tray. The new layout allows much easier servo access than the previous design, allows the servo to be installed without trimming its mounting tabs and gives the completed chassis a much lower profile. A less obvious yet insightful feature is the chassis' well-rounded shape; it presents fewer opportunities for boards, pipe joints, or other cars to snag it.

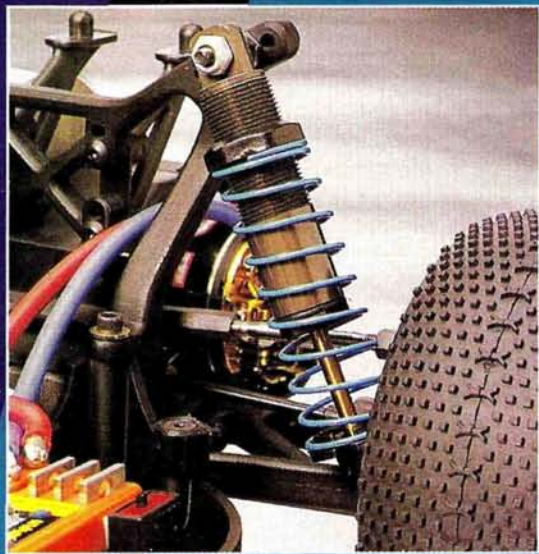
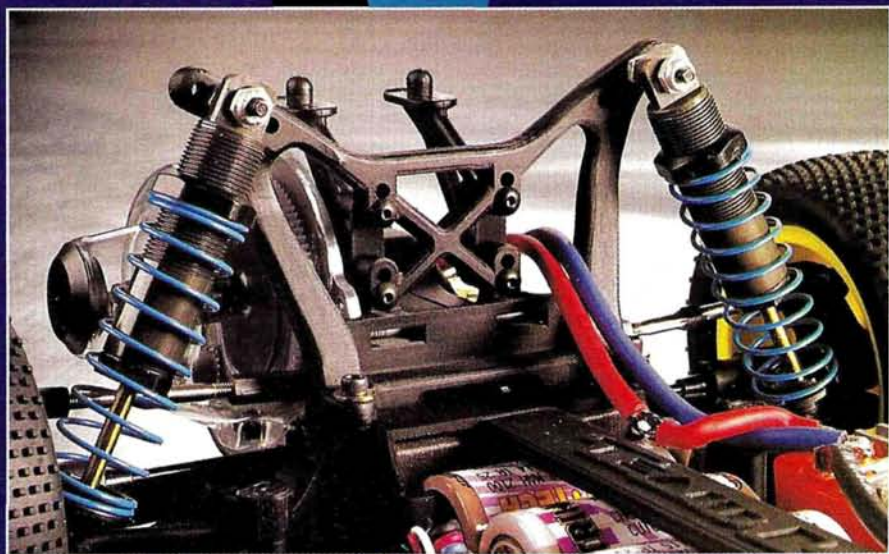


Tale of the tape

Length overall	14.75 in.
Wheelbase	10.6 in.
Width (F/R)	9.8 in.
Front kick-up	30°
Rear anti-squat	0°
Ride height (arms level)	0.815 in.
Rear toe-in	3°

All the specs listed here could change, but this is how the prototype measures up. We didn't weigh the car, since it's a prototype made of materials that are different from those that will be used in production. Losi assures us that the car will be lighter than the XX 'CR.'





REAR SUSPENSION

Team Losi shakes up the long-shocks-in-the-back design standard by spec'ing standard-length rear dampers for the Triple-X. According to designer Gil Losi Jr., this lowers the center of mass and provides a more progressive damping and spring rate. The shorter shocks are also lighter. The uniquely shaped rear shock tower is combined with the rear bulkhead to simplify assembly and trim weight (35 percent lighter than the Double-X's equivalent parts, according to Losi), and four positions are available for the upper shock mounts. The arms are very cleanly shaped, with two positions available for the lower shock mounts. New hubs are mated to the arms and allow two camber-link placement options to match the two provided on the rear bulkhead. Spacers are used to permit wheelbase adjustments by sliding the hubs fore and aft on the hinge pins.

BODY

The low-profile body gives the Triple-X a deeply "slammed" look, and the 4WD-style fastback cockpit further defines the new buggy as something entirely different from the current field of 2WD machines.



IMPRESSED?

When rumors began circulating about a new Team Losi buggy, it was hard to imagine how the existing XX 'CR' could be significantly improved. Aside from cleaning up the front end braces for better servo access, there didn't seem to be much on the XX that needed fixing—particularly if you subscribe to the "If it ain't broke ..." design philosophy. Team Losi obviously had other ideas—good ideas, in our opinion. Even with such visually jarring features as the up-front camber links, the Triple-X just seems so right, so logical, that it can only be faster and easier to drive. In fact, team driver Greg Hodapp reportedly trimmed his fastest laps by 0.2 second on his very first outing with the car. Brian Kinwald, who has been working on the project since its inception but has had to wait

for the official go-ahead to compete with it, said this: "Finally, I'll get to race it. You don't know how hard it is to have a car that is so much faster than anything else out there and not be allowed to race with it." When Brian's impressed, we're impressed.

**Addresses are listed alphabetically in the Index of Manufacturers on page 209.*



Tamiya GT-One Toyota TS-02

by Doug Mertes

Years before 4WD sedan became the dominant parking-lot class, Tamiya* manufactured a collection of cars that reflected what was then the world's most exotic and expensive full-scale racing technology. These full-fender GTP cars had closed cockpits, a tub chassis and suspensions borrowed from the F102 series. Although these Mazda-, Mercedes- and Nissan-body cars were pretty cool, they weren't as popular as the new sedans, so after the 1995 season, Tamiya dropped them from the TCS series lineup. Full-scale GTP racing, which languished in the years following Nissan's and Toyota's total domination of the series, ended at about the same time. Except at particular venues such as

Le Mans, these sleek speed demons were replaced by open-cockpit World Sports Cars. Though long gone from the parking-lot scene, those sleek, mod-motor GTP siz-zlers are fondly remembered by many older racers for their high speeds and close racing.

FIA GT-1-class racing, which also featured closed-cockpit cars and exotic technology, looked as if it would stage a comeback in 1998. Although it ultimately lost participants (and a 1999 schedule) because of the extraordinary expense of fielding a competitive car, the mighty GT-1 circus made two televised appearances in the United States. Although termed "endurance" contests, these were actually 3-hour sprints with racing that

FULL-BOD

PHOTOS BY WALTER SIDAS



was close and exciting from start to finish.

Combined with the highly publicized appearance at Le Mans of three factory-supported Toyota cars whose combined development cost was rumored to be well over \$100 million, this exposure resulted in a demand for similar radio-control vehicles. At the Chicago Hobby Show in October 1998, Tamiya revealed its response: a full-body GT-1 car based on the highly respected and successful 103RS F1 chassis but equipped with a 23-turn modified motor and reinforced radial rubber tires. The Tamiya GT-One Toyota TS-020 is a highly scale package that looks capable of real performance. Let's check it out.

s p e c s

SCALE 1/10
LIST PRICE \$198

DIMENSIONS

Length overall 17.9 in. (555mm)
Wheelbase 10.16 in. (258mm)
Width 8 in. (204mm)

WEIGHT

Gross, as tested 46 oz. (1,304g)
Empty 26.6 oz. (760g)

CHASSIS

Type Flat plate
Material Fiber-reinforced plate (FRP)

DRIVE TRAIN

Type Direct drive
Primary Pinion/spur
Differential(s) Ball
Slipper clutch None
Bearings/bushings Both

SUSPENSION (F/R)

Type Fixed-length upper link w/coil spring over kingpin/flexible T-plate mounted on O-rings
Damping None/friction damper

WHEELS

Type One-piece molded plastic

TIRES

Type Tamiya A-compound slicks w/foam inserts

ELECTRICS

Motor 23-turn Sport Tuned, 540 type
Battery Not included
ESC Not included

FORMULA

KIT FEATURES

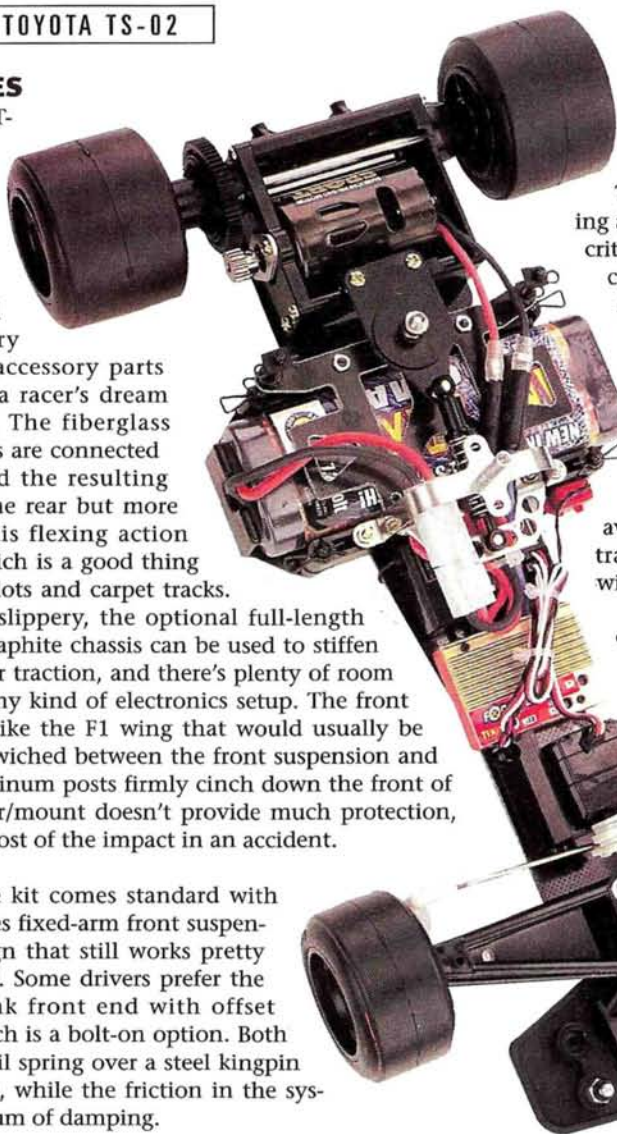
• **CHASSIS.** If the GT-One chassis looks familiar, it's because it's identical to those found on all Tamiya 103 series F1 cars since 1993, along with a handful of time-tested factory hop-ups. All of the accessory parts that make the F103 a racer's dream will fit the GT-One. The fiberglass upper and lower decks are connected with 3mm bolts, and the resulting assembly is stiff in the rear but more flexible up front. This flexing action increases steering, which is a good thing on high-bite parking lots and carpet tracks. If your track is very slippery, the optional full-length upper deck or hard graphite chassis can be used to stiffen things up and add rear traction, and there's plenty of room to install just about any kind of electronics setup. The front bumper is new, and like the F1 wing that would usually be found here, it is sandwiched between the front suspension and the chassis. New aluminum posts firmly cinch down the front of the body. The bumper/mount doesn't provide much protection, as the body absorbs most of the impact in an accident.

• **SUSPENSION.** The kit comes standard with the old-style, 103-series fixed-arm front suspension. It's a solid design that still works pretty well most of the time. Some drivers prefer the articulated upper-link front end with offset steering spindles, which is a bolt-on option. Both designs use a small coil spring over a steel kingpin to provide suspension, while the friction in the system provides a modicum of damping.

Out back, a single spring supports the rear pod. Although it provides no damping effect, the nail-and-spring assembly does a good job of adjusting ride height. Fortunately, any sedan-size, oil-filled Tamiya shock will fit and will open the door to damping and spring-rate changes. Rear-pod damping is especially critical on a bumpy parking lot whose surface irregularities can throw the car off line. At the speeds this puppy can reach, that could be a real problem!

While the nail/spring or optional shock handle suspension effectively, they do nothing to control the pod's side-to-side movement. To combat roll forces, a triple-plate friction damper assembly relies on the stiction of grease applied to the plates for damping, while spring action comes from the fiberglass T-plate. A thinner, more flexible T-plate is available for more stick on dodgy surfaces. For untreated tracks with really serious traction problems, pair this with Tamiya's ball-mounted T-plate setup.

• **DRIVE TRAIN.** With keyed diff rings, a thrust-bearing assembly captured within the wheel and a choice of either the kit-supplied 63-tooth spur or optional 0.04-module spur gear, this unit offers super reliability, protection from the grit found on most outdoor tracks and a feel that's very smooth—despite having fewer balls than the typical pan-car diff. To save rotating weight, the kit comes with lightweight aluminum hubs on both sides of the steel axle. The rear pod that houses all the gear is identical to all 103-series cars and is assembled from four plastic



BUILDING & SETUP TIPS

Thanks to the low parts count, excellent packaging and comprehensive instructions, this kit goes together very quickly and can be easily completed (minus painting and decaling) in an hour or so.

■ You won't need to buy any special tools, but an Allen wrench for the 3mm setscrews and high-quality no. 1 and no. 2 Phillips screwdrivers make things easier. Go easy on the screw heads; they're a little soft.

■ Tamiya's ball-diff grease works pretty well, but I prefer to use Associated* diff lube on the balls and either MIP* CVD red grease, Tamiya ceramic lube, or Associated black grease on the thrust-bearing assembly.

■ There are no camber or caster adjustments to worry about, and the ride height is correct for the rubber tires. Use the second notch in the ride-height adjuster so the T-bar lies flat when the motor and batteries are installed. If you switch to foam tires, I strongly recommend that you install Tamiya's adjustable rear pod, part no. 53257 (the corresponding metal motor mount's part no. is 53277). This allows you to keep the chassis relatively flat in relation to the track as the foam tires wear down.

■ Place two or three rubber O-rings on the kingpin above the steering spindle to prevent the front end from diving under braking. This isn't legal for TCS, but it will prevent the front of the body from dragging on the pavement in tight turns.

■ Install an oil-filled shock absorber. Any sedan-size Tamiya shock works just fine, but Tamiya also makes a racy, pink-anodized-aluminum one specifically for

this chassis. Use 30WT oil with the 2-hole piston and a red tuned spring.

■ Tamiya TCS rules now permit you to hard-wire your motor and batteries instead of using Tamiya battery plugs and bullet motor connectors. Although I didn't do this for the photographs of the test car, I suggest that you wire the motor directly to the ESC and install a low-loss battery plug (like one of those from Deans* or Acer*) to minimize voltage losses. Sport packs will get you around the track in fine style, but consider using matched high-voltage cells for serious racing.

■ I used an inexpensive Cirrus* high-speed steering servo on the GT-One. Although the case is a little larger than a "standard" servo, it fit just fine. You don't need a lot of torque for this car, and some drivers actually prefer a slower servo, such as a Futaba* S-148 or 3001, on slippery tracks.

■ So that the CA will adhere properly to the rubber tires and the plastic rims, use Simple Green or dish detergent to remove the silicone molding agent from them.

■ These cars are very sensitive to the viscosity and stickiness of the fluid placed on the damper pucks. Tamiya sells three grades of puck lube, and you can always experiment with whichever greases or lubes you already have in your workshop.

YOU'LL NEED

- 2-channel radio with receiver.
- Steering servo.
- Electronic speed control.
- 6-cell battery pack.
- Polycarbonate-compatible paint.
- CA glue for tires.

FACTORY OPTIONS

Thanks to the growth of F1's popularity over the past 10 years, a lot of tuning knowledge and a whole bunch of speed-enhancing parts are out there that can be used with the GT-One. The following are available from Tamiya.

- FRP upper deck (helps stiffen the chassis for more rear traction)—part no. 53186.
- Hard carbon-graphite chassis—53168.
- Flexible T-bar—53169.
- Metal motor mount—53183.
- Fine-tooth spur gears—53104.
- Bearings—53158.
- Carbon shaft—53116.
- Turnbuckle tie rods—53150.
- Low-friction, oil-filled damper—53173.
- Ball-mounted rear suspension—53273.
- Damper grease (soft/medium/hard)—53174/53175/53176.
- Low-friction damping pads—53149.
- Graphite upper plate—53147.
- Graphite damper plates—53148.

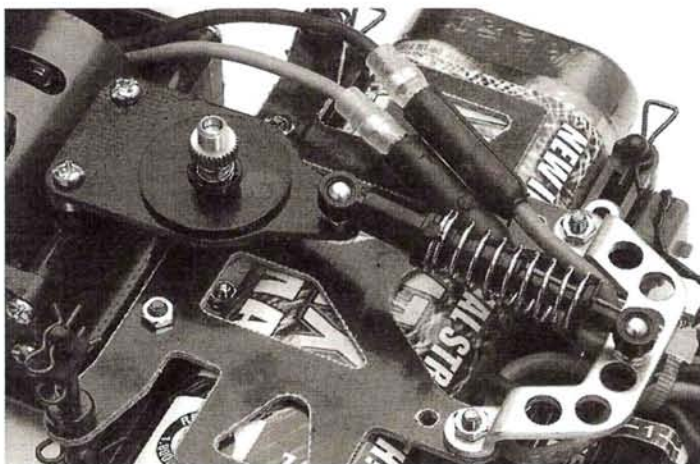


TEST GEAR

• Futaba Magnum Sport transmitter and receiver • Tekin* Formula 10 ESC • Trinity Amp Max II battery pack • Cirrus CS90BB high-speed steering servo

moldings that are screwed to the fiberglass T-plate. Tamiya supplies a 23-turn motor to get things moving.

• **STEERING.** The steering servo is taped to a plastic bracket that is then screwed to the chassis. The included wire tie rods are attached to the supplied servo-saver with Z-bends and join the steering knuckles via threaded-on ball ends. The stock linkage works well for most drivers, but the design has a lot of slop. Tamiya's optional ball-mounted turnbuckle links are tighter, more durable in a collision and allow more precise toe-in settings.



The drilled-out suspension support lends a "works" look to the rear end. Although it looks like a small oil damper, the "shock" is little more than a spring-loaded shaft. Note the threaded post that allows the tension of the puck-type pod damper to be adjusted.

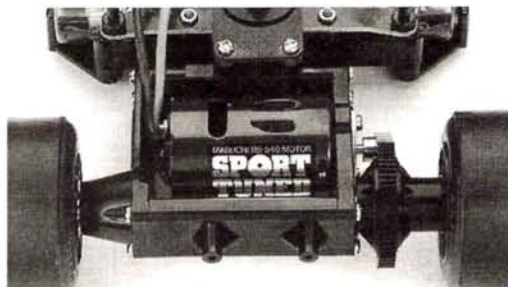
• **WHEELS AND TIRES.** Like sedan tires, the new, reinforced slicks are molded of a soft compound and use a sponge liner. Nicely designed grooved rims complement the tires, which wear better than foams and work pretty well with the kit motor on most asphalt surfaces. My testing revealed occasional wheelspin out back and a lot of push in the front. It's rumored that softer, B-compound tires are on the way to help tune the ride.

PERFORMANCE

Since the GT-One is modeled after Toyota's Le Mans entry, I expected plenty of downforce from both ends, and I wasn't disappointed. The car was initially tested on an unprepared parking lot; I found that it was stable and predictable when tossed through corners. It's entertaining to enter a turn at high speed, whip the car sideways, scrub off some speed and take a late apex. Now, that's fun! Overall, this car is easier to set up and drive than its foam-tire F1 coun-

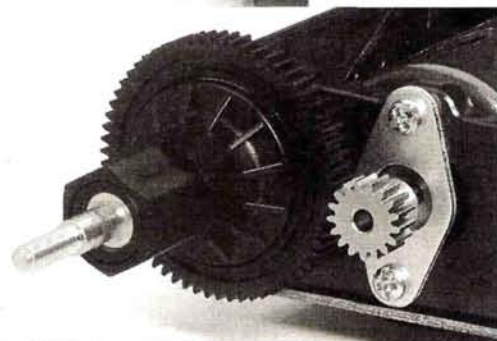
terpart, yet speeds are comparable, thanks to the included 23-turn motor. The speed doesn't kill the batteries, either, as evidenced by an average run time of 10 to 12 minutes using decent 2000 cells. I did most of my testing with Trinity's* Amp Max II sport pack on board. Even though this is rated at 1500mAh, it still resulted in 6 to 8 minutes of fun.

The same soft motor magnets that give you long run times also prevent the rear end from locking up when you chop the throttle. On the carpet at The Track of Maryland, the chassis lacked the crisp handling of a full-fledged, pro-level pan car. On the other hand, it was only about $\frac{2}{10}$ second off the lap times of



Left: Tamiya includes a Sport Tuned motor with the GT-One for some extra scoot.

Right: the GT-One's smooth-turning ball diff features keyed rings. The thrust bearing assembly is captured in the wheel (not shown).



Left: suspensions don't get any simpler than this. The bottom-mounted spring is easily changed by removing the lower E-clip.

vehicles that cost at least twice as much!

Initial response from the racing community was so positive that Tamiya has added a Le Mans class to the TCS lineup. Using the Toyota GT-One and recently released Porsche GT1-98 body sets (others are expected but have yet to hit the shelves), these will be 5-minute races that incorporate the kit's rubber tires and black can, sport-tuned motor. Diehard F1 racers who already own a chassis can purchase the body set and tires separately, although it may be less expensive in the long run to buy the complete kit.

FINAL THOUGHTS

With the GT-One's good looks, easy maintenance, low cost, proven performance and rubber slick tires, it looks as if Tamiya has put together a real winner. Everywhere I went with the test car, people gathered around to ask questions about how much it cost, how it was put together and how well it performed. Based on conversations with my F1 buddies, it sounds as if many of them will participate in this class.

*Addresses are listed alphabetically in the Index of Manufacturers on page 209.

- Simple, lightweight, elegant design.
- Gorgeous body with lots of downforce.
- Easy to tune, with lots of proven hop-ups available.



Likes

- Please, Tamiya, add a real shock to the kit!

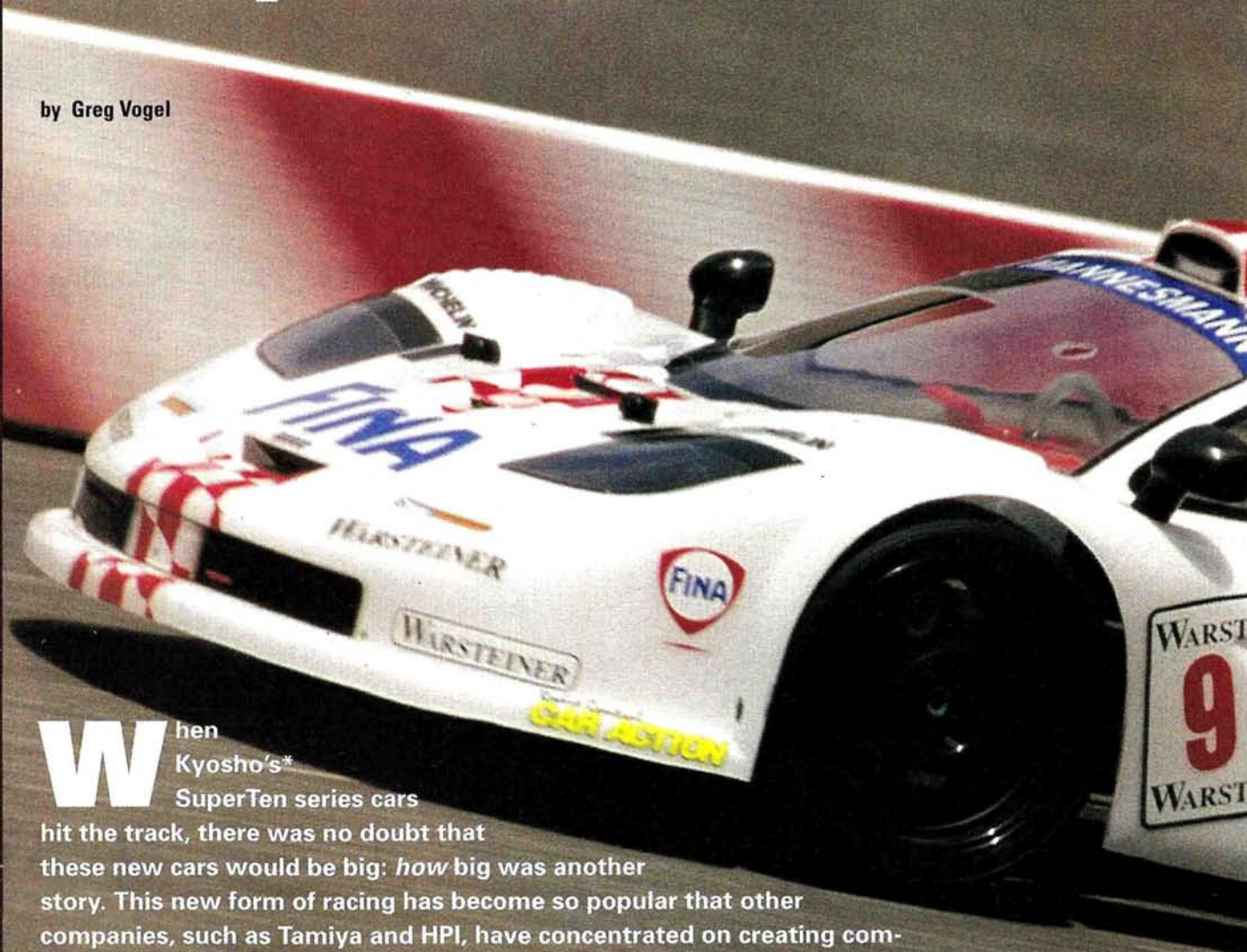


dislikes



Kyosho **SuperTen** Competition III

by Greg Vogel



When Kyosho's* SuperTen series cars

hit the track, there was no doubt that these new cars would be big: *how* big was another story. This new form of racing has become so popular that other companies, such as Tamiya and HPI, have concentrated on creating competition cars for the class. But in its ceaseless efforts to create a better car, Kyosho has taken the super-class one step further with its latest release, the Competition III; the kit is loaded with cool features that are sure to make your jaw drop. Let's take a look at Kyosho's latest super car.

SUPER

SPECIFICATIONS

SCALE Super 1/10
LIST PRICE \$749.99

DIMENSIONS (chassis only)

Length overall 16.5 in. (418mm)
Wheelbase 11 in. (280mm)
Width 8.7 in. (220mm)

WEIGHT

Gross, RTR 4.3 lb. (1,950g)

CHASSIS

Type Double deck
Material Aluminum lower plate/carbon-fiber upper plate

DRIVE TRAIN

Type Shaft
Primary Clutch bell/spur
Drive axles Dogbones
Differential(s) Bevel gear
Bearings/bushings Bearings

SUSPENSION

Type Double A-arm
Damping Oil-filled, coil-over shocks

WHEELS

Type (F/R) 5-spoke; narrow/wide

TIRES

Type Soft compound treaded

POWERPLANT

Engine O.S. 1D-X
Carb Slide
Muffler/pipe Tuned pipe



FREAX

KIT FEATURES

• **BASIC FEATURES.** Before we tear into the included hop-up parts, let's take a quick look at the standard features the Comp III shares with the other members of the SuperTen family.

A gear diff handles the distribution of power to the wheels through the corners. Although grease is supplied, the diffs may be filled with oil (see "Building & Setup Tips"). A pivot-ball suspension handles the bumps and makes it easy to adjust camber, track, caster and toe. Oil-filled, coil-over shocks damp all four corners, and optional pistons and ride-height-adjusting clips are supplied. A front pivoting swaybar keeps the front end in check.

To slow and stop the car, a stainless-steel, vented disk brake takes charge. Fiber pads glued to the brake pads grab the disk.

Unfortunately, you won't find one of Kyosho's super-detailed bodies with this kit; however, you will find soft-compound treaded tires with foam inserts, ready to be mounted to the kit's black, 5-spoke rims. Now, let's take a look at the go-fast parts that separate a Comp III from the average SuperTen:

• **CHASSIS.** The 3mm-thick chassis not only offers more rigidity because of its thickness, but it also features countersunk screw holes that prevent screws from scraping the ground and prevent the loss of down-travel. To conserve weight, the chassis has been relieved of excess material in non-stress areas, and to improve heat dissipation, its engine area has been slotted. The aluminum lower chassis is mated to a graphite upper deck, which may flex but will not stay bent, unlike the stock aluminum upper deck of "regular" SuperTens. Along with the thick lower plate, this piece helps create an ultra-rigid chassis and provides a sturdy mounting platform for the servos and other electronics.

• **STEERING.** Kyosho didn't go as far as providing bearings for

the Comp III's steering, but the metal bushings (upgraded from plastic) are a welcome sight.

• **FULL BEARINGS.** With the exception of the aforementioned bellcranks, everything that spins is supported by shielded bearings. Rubber-sealed units would have been even better, but anything beats the standard kit's bushings.

• **REAL SPRINGS.** To get you dialed in more quickly and for less money, Kyosho includes springs that work well on the car's front and rear in normal race conditions.

• **ONE-WAY DIFF.** With the name "Comp III" printed on the box, at the very least, we expected to find a 2-speed in the kit. We were wrong, but we did find a pleasant surprise: a one-way unit that allows the entire drive train to free-wheel when decelerating. This setup requires heavier use of the brakes because the engine can no longer be used to help slow the car. The setup also allows spur-gear changes; a standard kit has a one-piece molded center hub/spur gear that doesn't permit changes to be made.

• **REAR TOE ARMS.** The standard super's upper arm is a fixed unit that does not allow rear toe to be changed. To change toe, the included optional arm uses pivoting balls with an adjustable ball cup.

• **POWERPLANT.** Kyosho's stock .15 engine moved the car at a respectable pace, but let's face it: on the track, it was no match for potent aftermarket engines. Kyosho has put a potent powerplant—the O.S. LD-X—into the kit. This low-center-of-gravity engine comes fitted with a pull-starter and a slide carburetor for smooth throttle transitions. The flywheel and clutch assembly are bolted to the engine with a 15-tooth clutch bell that is ready to be mated with the spur.

To maximize the potency of the engine and gearing, a tuned pipe allows the engine to breathe. A molded silicone coupler is included.

BUILDING & SETUP TIPS

■ Step 3. Add a little grease to the steering posts; it helps the bellcranks turn smoothly.

■ Step 4. I opted to use silicone oil in the diffs instead of grease. Be sure to properly seat the O-rings on the output shafts; if improperly installed, they will leak. I filled the front diffs $\frac{3}{4}$ full of 5,000WT Kyosho silicone oil and the rear diffs $\frac{3}{4}$ full of 1,000WT. I also ran a bead of silicone rubber along the rim of the casing and screwed the gear plate into place. When this is done correctly, the diffs will perform more consistently than if filled with grease and will not leak.

■ Step 5. Make sure that the bearings labeled "22" are well seated in the gear case; installed improperly, they can cause binding.

■ Step 6. Dab some grease on the threads in the plastic steering knuckle before you install the pivot-ball retainers; this will allow the retainers to be screwed in more easily. Also, be careful not to cross-thread the retainers.

■ Step 10 recommends that you adjust the steering links to 6mm between ball ends. I found that this gave the car a little too much toe-out; 7.5mm works much better.

■ Step 14. Adjustable-toe, rear upper arms are supplied, as are the stock arms that are shown in this step. To install the adjustable arms at step 14, see step 40.

■ Use Loctite* on all fasteners that are screwed into metal.

YOU'LL NEED

- 2-channel radio system w/two servos and receiver battery.
- Fuel.
- Glow-starter.
- Paint.
- Body.
- CA glue for the tires.

FACTORY OPTIONS

- Spur gear: 35T/37T/39T—part no. Kyoc 5899/5910/5921.
- Fuel filter—Kyoc 3978.
- Universal swing shaft—Kyoc 6127.
- High-performance brakes—Kyoc 4208.
- Extra-hard silicone oil—Kyoc 5739.
- Ball-diff set—Kyoc 2141.
- 2-speed tranny—Kyoc 6565.
- Vespel clutch shoe—Kyoc 3006.
- Spring set—Kyoc 5858.
- Foam bumper—Kyoc 2678.
- Carbon upper deck—Kyoc 6308.



TEST GEAR

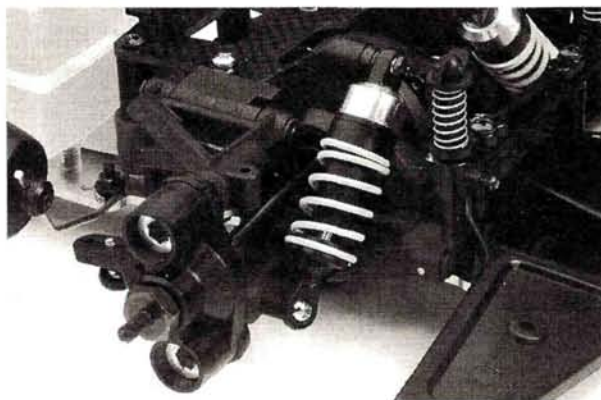
• Airtronics* M8 radio gear • Airtronics 94257 steering and 94102 throttle servos • Dynamite* receiver pack • Blue Thunder* 20-percent Race Formula fuel

PERFORMANCE

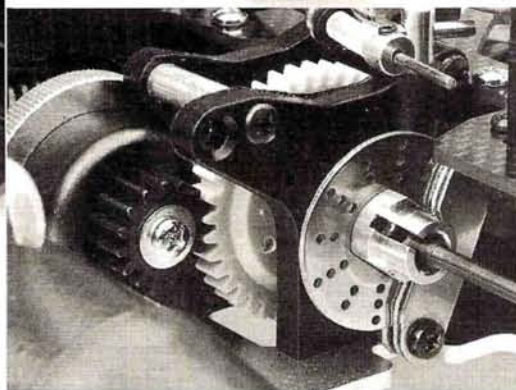
When you stab the throttle, the Comp III gets up and goes in no time at all. It has always been a subject of debate, but I believe that the efficiency of the shaft-drive system has something to do with the SuperTen's excellent acceleration.

Another element that certainly has something to do with the car's acceleration and speed is the O.S. .12 LD engine. When we tested the box-stock Kyosho .15-powered SuperTen for the "Super Nitro Touring Shootout" in our *Radio Control Touring Cars* special issue, it featured best-in-class acceleration and a respectable top speed of 29.03mph. We knew, however, that the stock .15-size engine and muffler would

Right: the Comp III includes an upgraded chassis that is stronger than stock and features countersunk screw holes for improved ground clearance. Below: front camber and track can be quickly adjusted without removing the body, thanks to the pivot balls attaching the hubs to the suspension arms.



Right: the center spur gear is mounted on an aluminum housing with a one-way bearing in the center. This unit allows you to swap the stock gear for optional gears.



not push it as fast as it could go. We put the Comp III under the scrutiny of the radar gun to see just how much the factory hop-ups, LD engine and a tuned pipe

would impact performance. The Comp III topped out at 40.7mph—almost 11.7mph faster! That's about a 40 percent increase! According to our stopwatch, the Comp III was up to maximum velocity in roughly 3 seconds—nearly identical to the times of the stock machine, but it was going 11mph-plus faster!

In the corners, however, the car was pretty sketchy. Even on a prepared surface, the tires didn't have ideal traction. A quick swap to 30-compound (softer) tires all the way around, and I was back out for more tests. After the tire change, I found the car very responsive to my commands. I was able to enter the corners at high speed, tap the brakes to bring it in close to the apex and then power out with authority. The rear did tend to dance a little, but didn't get the car uncontrollably out of shape.

The car might have benefited more if I had slapped on a pair of 25s, but I didn't have any, so I compensated whenever the rear got happy.

FINAL COMMENTS

After countless hours of running a stock SuperTen for a feature in our new *Radio Control Touring Car* special issue (check at your hobby shop, if you don't already have it) and after running countless tanks of gas through my own, fully loaded SuperTen, I have a pretty good idea what works on the car and what doesn't. Kyosho's kit includes all the "must-have" parts except a 2-speed tranny.

If you're looking to get into this racing class, the Comp III kit is the only way to go. With some driving skill behind the wheel, the car could get you to the podium. The countless adjustment options are a tuner's dream, and the LD engine is definitely a potent powerplant that's capable of

keeping the car in the midst of its competitors. The Kyosho SuperTen has been—and remains—my racecar choice.

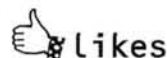
**Addresses are listed alphabetically in the Index of Manufacturers on page 209.*

THE COMPETITION

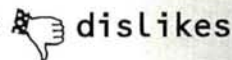
	HPI	Tamiya	Kyosho
	Super Nitro RS4	TGX Mach 1	Comp III
Wheelbase	11.02 in. (280mm)	11.8 in. (300mm)	11 in. (280mm)
Width (F/R)	8.82 in. (224mm)	9/8.75 in. (229/222mm)	8.7 in. (220mm)
Diff type	Gear	Gear	Gear
Chassis	Aluminum	Duralumin	Aluminum
List price	\$499	\$514	\$749.99
Available at**	\$307	\$334	\$499.99
Reviewed in	3/99	9/95	9/99

**Prices vary with location.

- Thick chassis plate.
- High-performance O.S. LD-X engine.
- Highly tunable chassis.



- No 2-speed tranny.

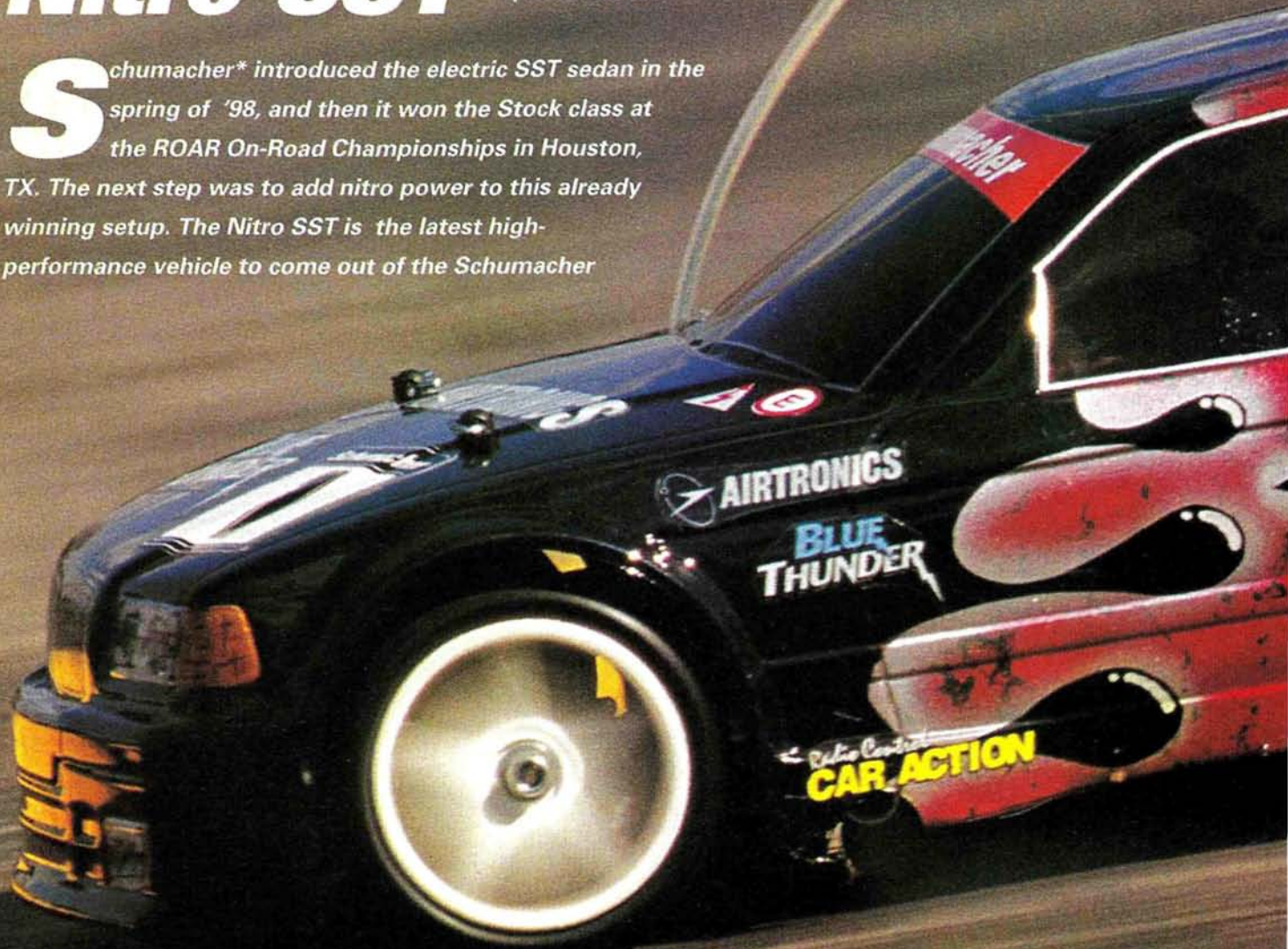




Schumacher Nitro SST

by Kevin Hetmanski

Schumacher* introduced the electric SST sedan in the spring of '98, and then it won the Stock class at the ROAR On-Road Championships in Houston, TX. The next step was to add nitro power to this already winning setup. The Nitro SST is the latest high-performance vehicle to come out of the Schumacher



SUPER

SCALE 1/10
LIST PRICE \$590

DIMENSIONS

Length (overall) 17 in. (432mm)
Wheelbase 10 in. (254mm)
Width 7.28 in. (185mm)

WEIGHT

Gross, RTR 52.5 oz. (1,500g)

CHASSIS

Type Double deck
Material Fiberglass

s p e c s

DRIVE TRAIN

Type Dual Kevlar belt
Primary Bevel gear
Drive axle Plastic universal
Differential(s) Ball
Bearings/bushings Bearings

SUSPENSION (F/R)

Type Lower A-arm w/adj.
upper link
Damping Plastic oil-filled, coil-over
shocks w/adj. damping

WHEELS

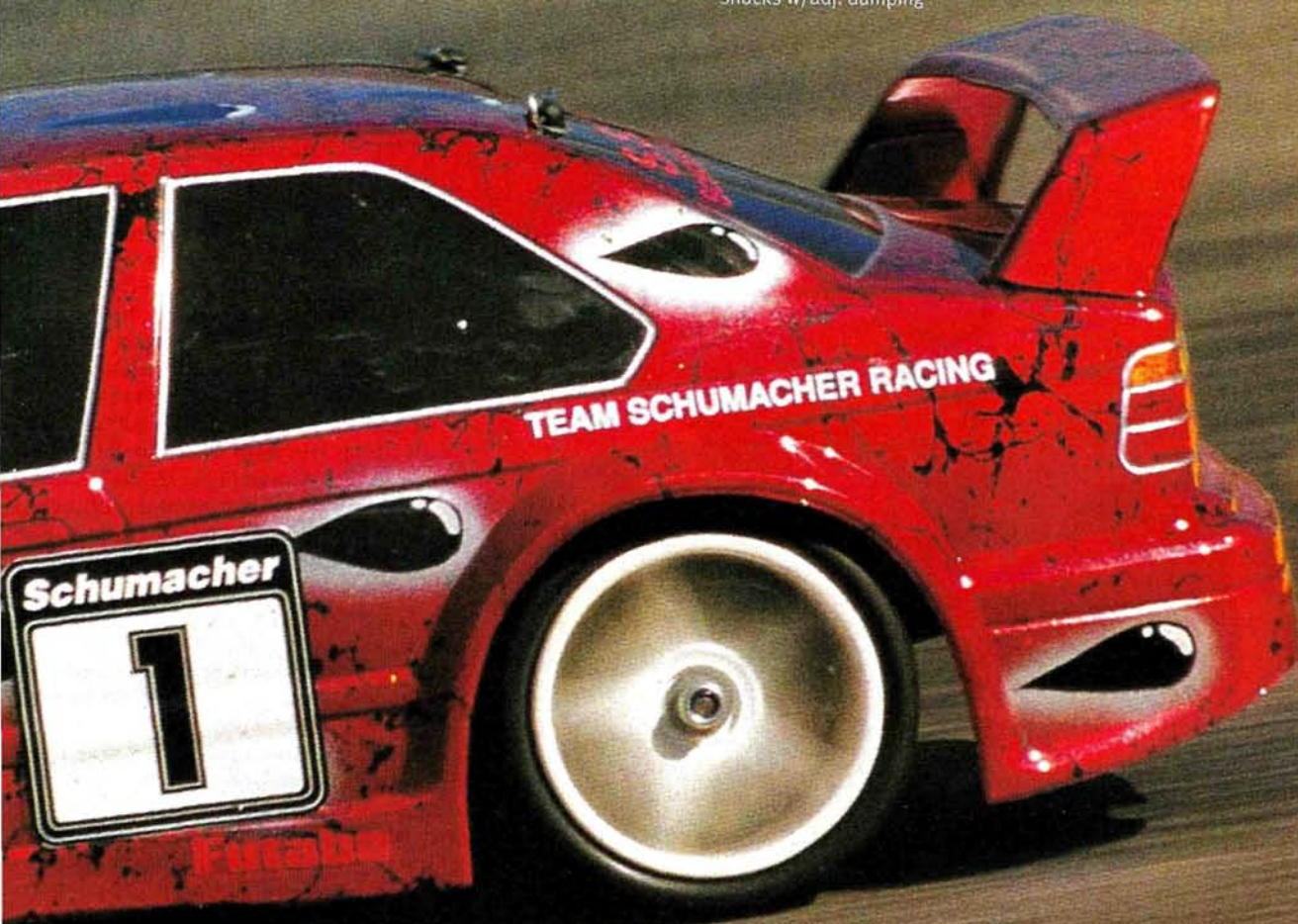
Type 5-spoke plastic
Dimensions 1.9x1 in.

TIRES

Type White-compound slicks

POWERPLANT

Engine Thunder Tiger .12
pull-start
Carb Rotary
Pipe Tuned type, included



garage. Whenever you add a powerful
nitro engine to anything, it increases the excitement. This car
has many of the same features as its electric cousin but there are also some
new ones—in particular, a unique (to say the least) means of channeling
nitro power into the SST's existing 2-belt drive train. Let's check it out.

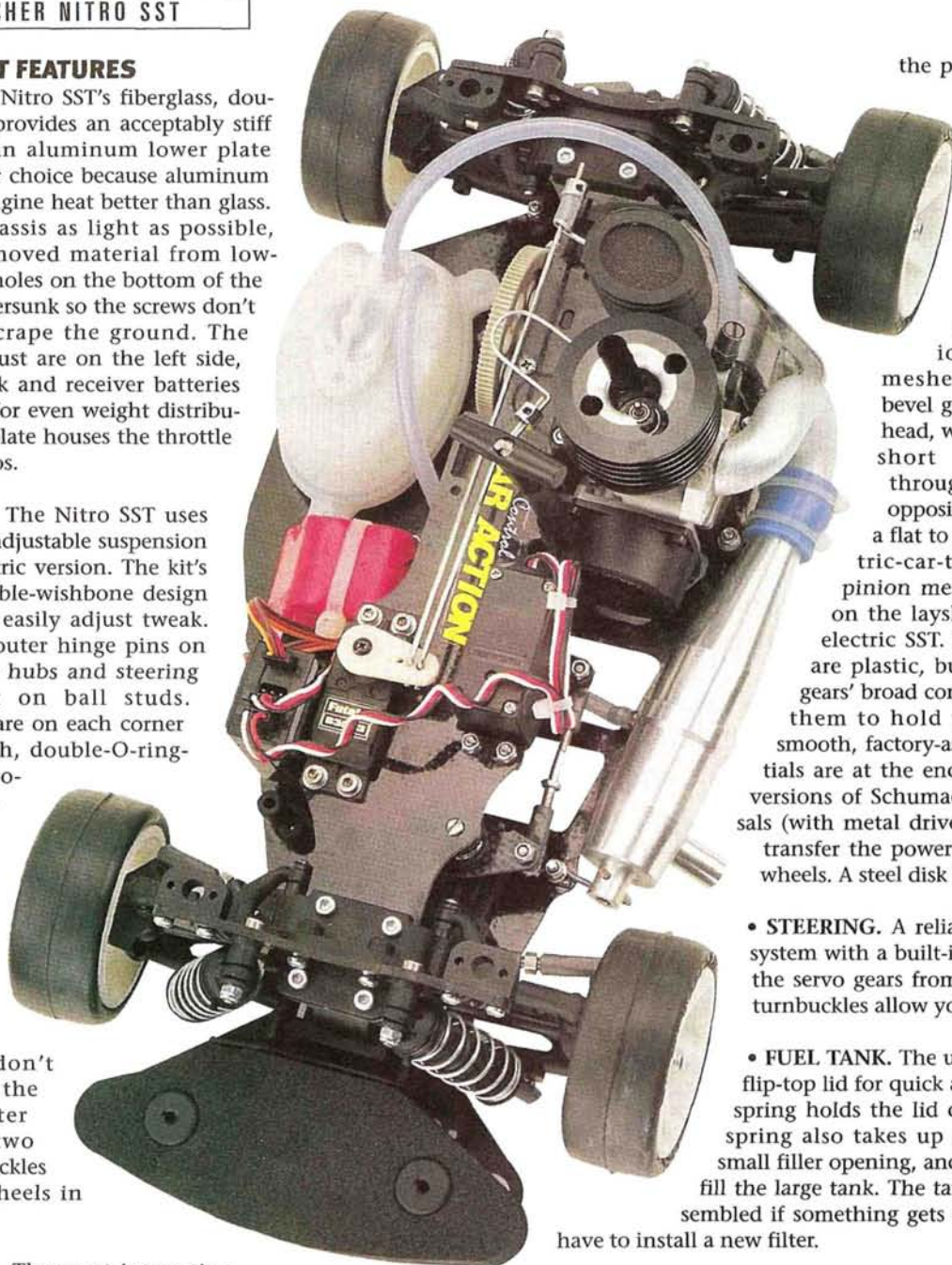
SONIC!

KIT FEATURES

• **CHASSIS.** The Nitro SST's fiberglass, double-deck chassis provides an acceptably stiff backbone, but an aluminum lower plate would be a better choice because aluminum helps dissipate engine heat better than glass. To make the chassis as light as possible, Schumacher removed material from low-stress areas. The holes on the bottom of the chassis are countersunk so the screws don't protrude and scrape the ground. The engine and exhaust are on the left side, and the fuel tank and receiver batteries are on the right for even weight distribution. The upper plate houses the throttle and steering servos.

• **SUSPENSION.** The Nitro SST uses the same highly adjustable suspension setup as the electric version. The kit's race-proven, double-wishbone design has setscrews to easily adjust tweak. You won't find outer hinge pins on the car: the rear hubs and steering knuckles pivot on ball studs. Oil-filled shocks are on each corner and ultra-smooth, double-O-ring-sealed shocks provide the damping. Adjustable pistons inside the shocks allow you to change the number of piston holes without having to change pistons. You don't need to change the rear hubs to alter toe, either; two adjustable turnbuckles keep the rear wheels in check.

• **DRIVE TRAIN.** The most interesting part of the car—the 2-belt drive train—is lifted directly from the electric SST, which calls for a longitudinally mounted motor. The Nitro SST's engine, however, is mounted parallel to the chassis centerline, and that left Schumacher with



the problem of making the horsepower take a "left turn" to spin the belt system's layshaft. The solution is an inspired bit of engineering. The clutch bell features a huge bevel gear instead of the usual straight-cut pinion. The clutch bell meshes with a matching bevel gear in the center bulkhead, which is connected to a short shaft that passes through the bulkhead. The opposite end of the shaft has a flat to accept a standard electric-car-type pinion, and the pinion meshes with a spur gear on the layshaft—exactly like the electric SST. The large bevel gears are plastic, but it appears that the gears' broad contact area should allow them to hold up acceptably. Very smooth, factory-assembled ball differentials are at the ends of the belts. Plastic versions of Schumacher's "Blade" universals (with metal drive pins and stub axles) transfer the power from the diffs to the wheels. A steel disk brake stops the car.

• **STEERING.** A reliable bellcrank steering system with a built-in servo-saver prevents the servo gears from stripping. Adjustable turnbuckles allow you to easily adjust toe.

• **FUEL TANK.** The unusual fuel tank has a flip-top lid for quick access. A huge internal spring holds the lid down tightly, but this spring also takes up much of the already small filler opening, and that makes it hard to fill the large tank. The tank can easily be disassembled if something gets stuck inside, or if you have to install a new filter.

• **ENGINE.** A Thunder Tiger pull-start .12 engine is included. This engine runs well and is easy to tune, even for a beginner. The pull-starter makes starting easier and definitely beats lugging around a big, bulky starter box. A tuned pipe and header are included.

BUILDING & SETUP TIPS

■ Always read the instructions in full before you start to assemble any car, and follow proper engine break-in procedures. It takes only a few minutes, and your engine will thank you for it.

■ Get a long, thin screwdriver to adjust the engine's low-end needle. The needle's awkward location makes adjustments difficult otherwise.

■ When you make adjustments, make only one change at a time. If you make too many at once, you might not be able to tell which worked.

■ The instructions tell you to install the cap-head screws on the throttle servo from the bottom. To save time, install them from the top, and use a pair of needle-nose pliers or tweezers to hold the locknuts.

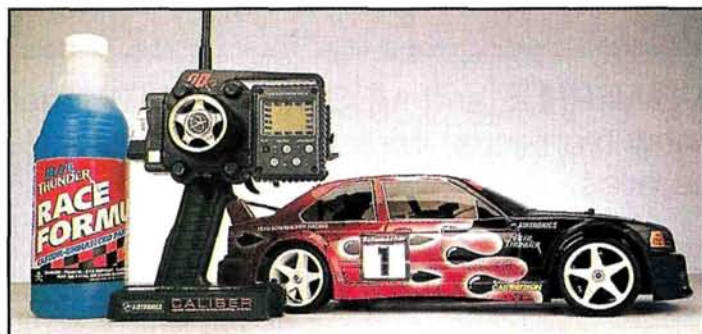
■ When you install the engine, make sure that the gear mesh on the plastic bevel gears is properly adjusted, or you may encounter stripping problems. Properly adjusted, they hold up well.

YOU'LL NEED

- 2-channel radio.
- Steering and throttle servos.
- Receiver pack.
- Glow igniter.
- Polycarbonate-compatible paint.
- Fuel.

FACTORY OPTIONS

- Micro shocks—part no. U2039.
- Titanium tie-rod set—U1908.
- Anti-roll-bar set—U1919.
- Spring-tuning set—U1921.
- Alloy shock bodies—U2024.
- Lexan belt guard—U1920.
- Foam body protector—U2022.
- Alloy one-way pulley set—U1910.



TEST GEAR

Futaba* S3003 servos • Airtronics* Caliber 3PS radio • 5-cell
Dynamite* Ni-Cd receiver pack • Blue Thunder* 20-percent-nitro fuel

PERFORMANCE

After breaking in the engine, I dropped in a new glow plug. Why? No real reason; it's just a part of my personal engine break-in ritual. I headed to the local high school parking lot to get a feel for the Nitro SST in a non-race environment before I hit the track. I threw out some corner dots, gave the engine two pulls, and it roared to life.

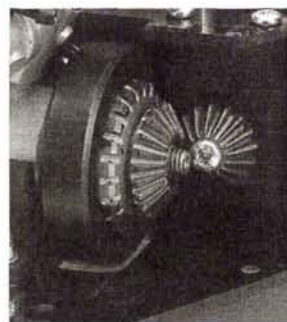
On stabbing the throttle, I was impressed with the acceleration. The car's factory setup is very loose, however, and it didn't fare well zipping around the randomly placed corner dots. I pulled it over to the tailgate of "Dah Dadge" [editor's note: "Dah Dadge" is Hingeboy lingo for "the Dodge," Kevin's prized truck]. A quick change from the stock rear springs to the optional soft ones would hopefully get me a little more rear bite. I also bolted on a new set of sticky Take Off* tires. Back on course, I zipped around with more control.

With some makeshift "track time" under my belt, I was ready to test the car in competition. On a controlled track surface, I checked out the brakes. I can definitely say the car has killer stop-

ping power, but I found it difficult to modulate and that hampered performance in the turns. During assembly, I had replaced the brake spring with fuel tubing (most nitro kits typically require this for adequate brake action), and this put too much pressure on the brakes when they were applied. Whenever I stabbed the brake in the turn, the wheels locked up and I overshot the turn. Use the stock spring, and set the brakes for controlled deceleration, not brute stopping force.

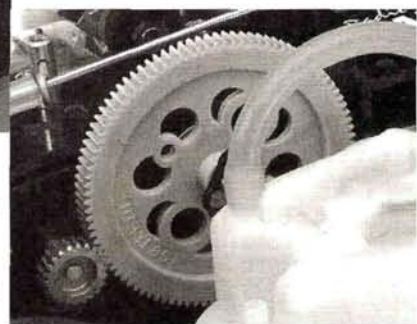
With the brakes suitably reset, I still noticed some push, but it didn't add too much time to my laps, so I left it alone. While I was on the track, the SST picked up some sand in a high turn, and it bound up the drive train. I recommend that you use the supplied Lexan guards; live and learn!

PAINTED BY: BODIES BY BRANCHES



Right: no; we didn't get our pictures mixed up. The car uses a pinion and spur from an electric SST. They withstood the power of the nitro engine without a problem.

Left: to transfer the power from the engine to the drive train, the Nitro SST uses two bevel gears. Make sure you use the dirt shield to cover these gears. It's not pretty when sand gets into the works.



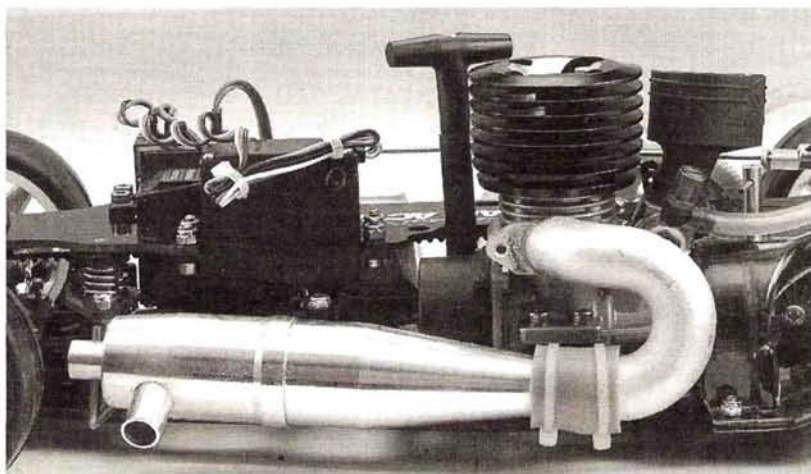
Likes

- Very adjustable suspension.
- Accelerates quickly.
- 90-percent assembled.
- Adjustable shock pistons.



dislikes

- Low-end needle not very accessible.
- Spring in fuel tank is awkwardly positioned.
- Fiberglass lower chassis does not dissipate heat.
- Plastic bevel gear is a potential weak point.



Schumacher supplies a header and tuned pipe with the kit. This system lets the engine breathe well, and it shows on the track; this car is fast!

FINAL THOUGHTS

Overall, I think the Nitro SST's performance is competitive. If you're a driver who doesn't mind taking extra time to work on a car's setup, you will be able to guide this missile around just about any track. A minor concern is the filler hole in the fuel tank. It is small and partially obstructed by the spring for the lid, so pit stops will take longer than most racers like. My other concern is that sand may enter and bind the belt drive train. To avoid problems, use a narrow-spout fuel bottle, and stay out of the sandpits on the side of the road. I will definitely visit the racetrack often with my Nitro SST.

*Addresses are listed alphabetically in the Index of Manufacturers on page 209.

THE COMPETITION

	OFNA Nitro Z-10 Pro/Semi Pro	HPI Nitro RS4 Racer	HPI Nitro RS4	FSR Nitro Bullet V-12	Mugen Prime 12	Schumacher Nitro SST
Wheelbase	10.28 in. (261mm)	10.25 in. (260mm)	10.25 in. (260mm)	10.25 in. (260mm)	10.25 in. (260mm)	10.04 in. (255mm)
Width (F/R)	7.32/7.20 in. (206/204mm)	7.2/7.85 in. (183/199mm)	7.2/7.85 in. (183/199mm)	7.5 in. (191mm)	7.5 in. (191mm)	7.48 in. (185mm)
Weight	49.4/49.1 oz. (1,400/1,392g)	51 oz. (1,446g)	50 oz. (1,418g)	52 oz. (1,474g)	58.5 oz. (1,650g)	52.5 in. (1,500g)
Diff type	Ball	Bevel gear	Bevel gear	Ball	Bevel gear	Ball
Brakes	Graphite/composite	Fiber	Composite	Graphite	Composite	Carbon composite
Exhaust	Muffler	Muffler	Muffler	Tuned pipe	Muffler	Tuned pipe
List price	\$499.95/\$359.95	\$329	\$329	\$499.99	\$355.99	\$590
Available at**	\$325.99/\$237.99	\$217	\$205	\$319.99	\$319.99	\$345
Reviewed in	8/98	8/98	6/97	2/99	7/98	9/99

**Prices vary with location

1ST LOOK

EXCLUSIVE!

Tamiya

TRF 414X

Taking the path more traveled

by Peter Vieira

DON'T TRY TO TELL US that you saw this car coming. There weren't any rumblings of a new sedan coming from the Tamiya* camp, yet here it is: the TRF 414X. Forget any "tee-ay-oh" stuff; the 414 is brand-new for the Big T, even if its essential design features are not new to the sedan scene. Yes, it is another dual-belt car, but it's



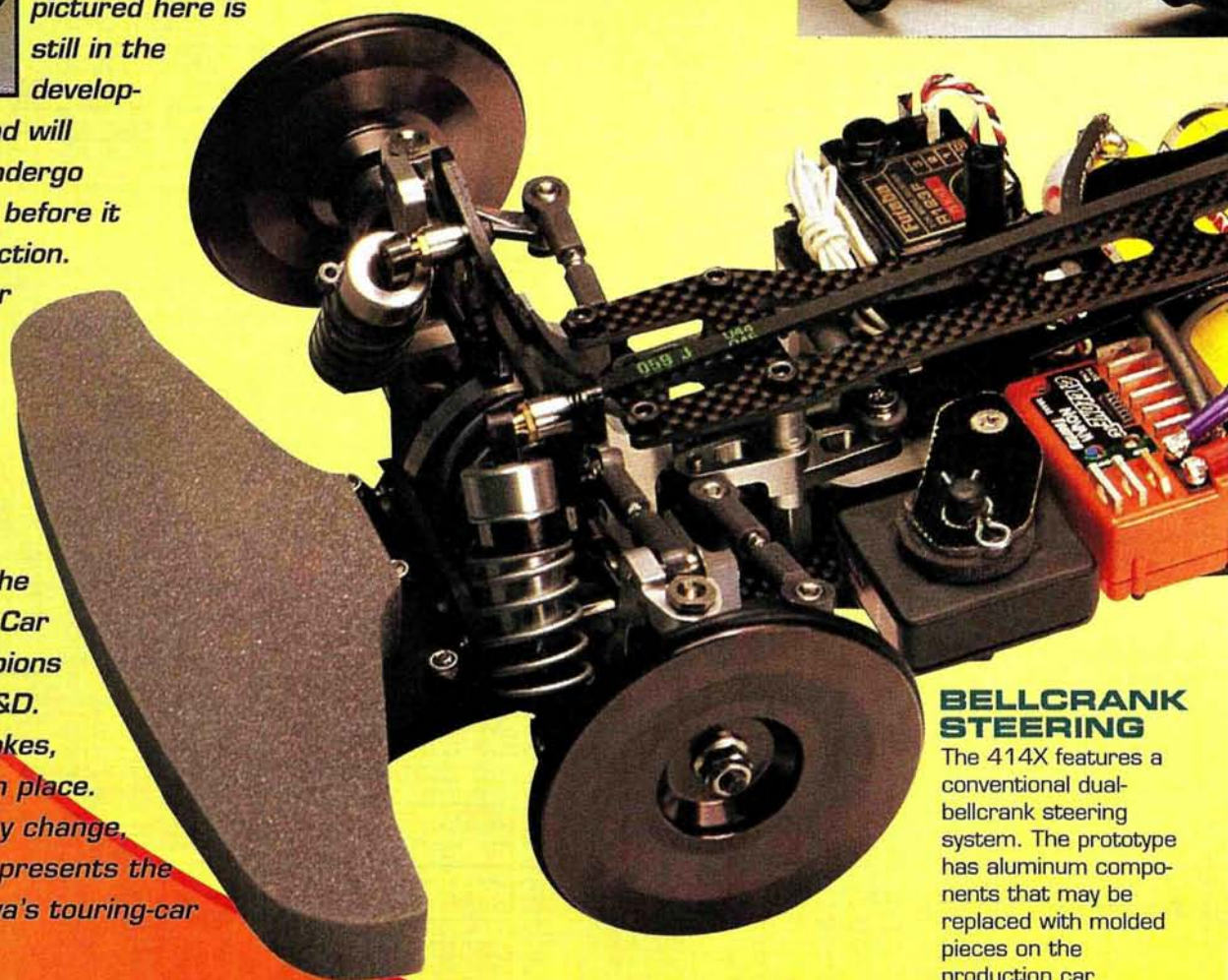
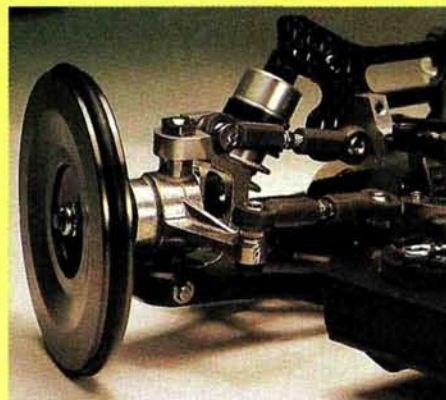
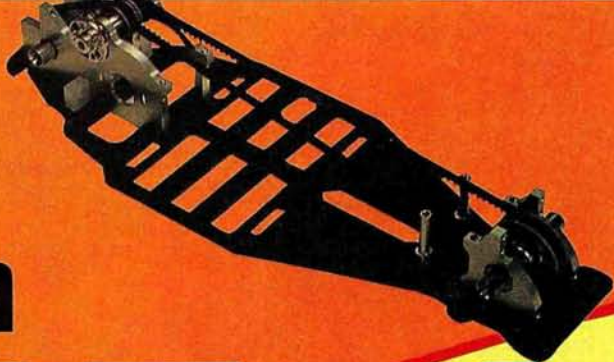
Tamiya's first, and you must be wondering what spin the R/C monolith has put on the touring-car archetype. The raw prototype

pictured here is still in the develop-

ment phase and will undoubtedly undergo some changes before it reaches production.

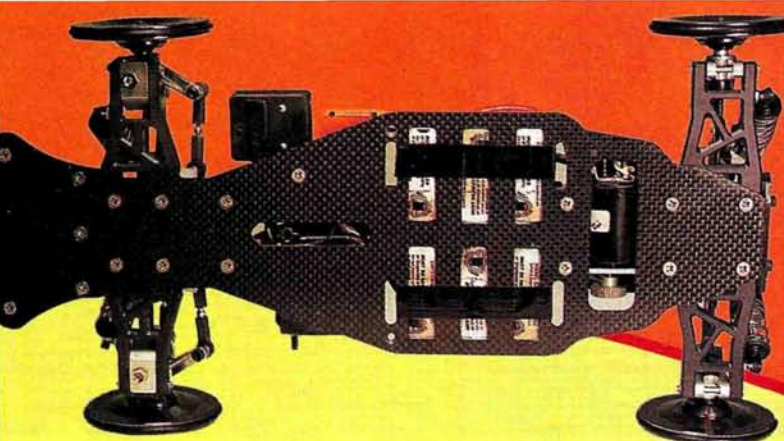
In fact, this car was photographed during a short layover at Tamiya America while on its way to the Reedy Touring Car Race of Champions for on-track R&D.

The broad strokes, however, are in place. The details may change, but this car represents the shape of Tamiya's touring-car future.



BELLCRANK STEERING

The 414X features a conventional dual-bellcrank steering system. The prototype has aluminum components that may be replaced with molded pieces on the production car.

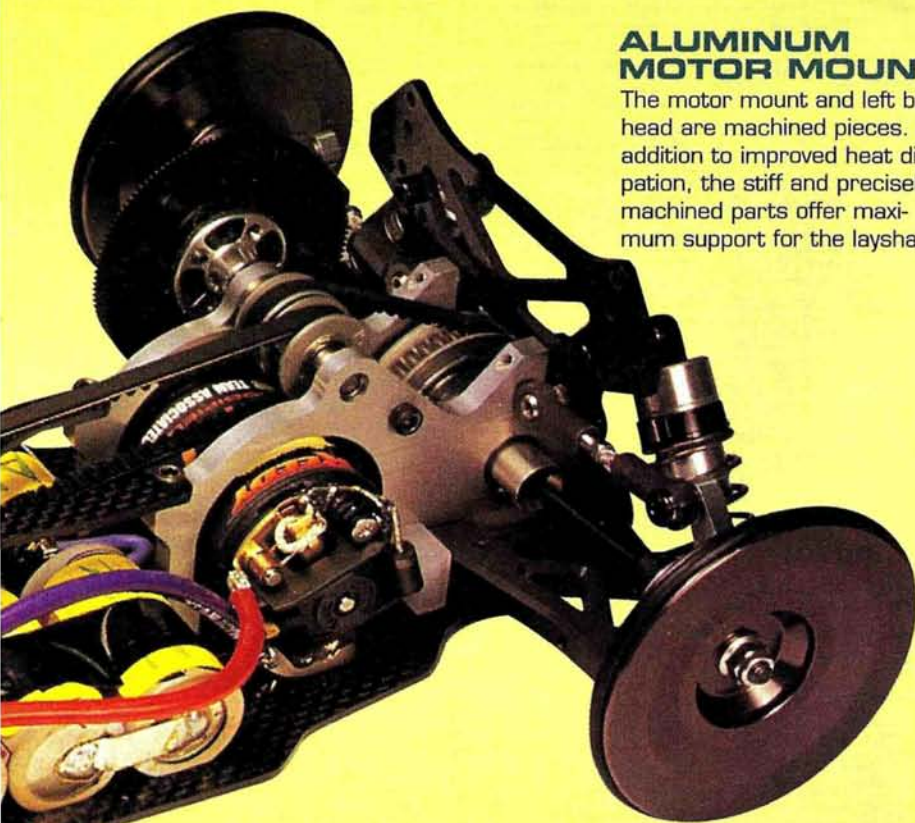


GRAPHITE PLATE CHASSIS

The proto chassis shows no provisions for a stick pack or even a quick-release system for the required saddle pack. We shouldn't fault Tamiya for opting to use strapping tape to hold the batteries in a racecar, but the decision to eliminate what has been a standard Tamiya feature speaks directly to the company's performance-first philosophy with respect to the 414X. The double-deck chassis' stiffness can be adjusted by altering the number and placement of aluminum standoffs.

ALUMINUM MOTOR MOUNT

The motor mount and left bulkhead are machined pieces. In addition to improved heat dissipation, the stiff and precisely machined parts offer maximum support for the layshaft.



SUSPENSION

The proto's suspension parts are machined from plastic stock and will be replaced with molded pieces once Tamiya has nailed down the geometry. Machined-aluminum caster blocks and cast-aluminum steering knuckles are used on the prototype but may be offered only as optional parts. Turnbuckle upper links handle camber adjustments, and caster will be adjustable via optional caster blocks. Anti-squat and toe-in will be adjustable in the rear, probably by changing the forward hinge-pin mount. As part of the development process, the graphite shock towers are "Swiss-cheesed," with holes for upper shock and camber-link mounting. The hole count will probably be reduced for production.

DUAL-BELT DRIVE TRAIN

No more gearboxes; the 414X is built around a two-pulley layshaft layout very much like tourers from HPI, Corally, Yokomo and others. Aramid drive belts are used in addition to oversize aluminum pulleys to reduce friction. Ball differentials with aluminum pulleys and flanges are used on the prototype, but molded units will almost certainly replace the machined-aluminum pieces. According to Dave Jun, tensioners are not necessary and are not provided for either belt. A word of advice, Tamiya: put 'em on the car and let the racers decide whether they're necessary or not.

JUST IN TIME?

Tamiya could be accused of jumping on the dual-belt "bandwagon," but c'mon; dual belts represent a proven design, not a trendy choice. Some may say "copycat," but racers loyal to Tamiya are more likely to say "It's about time." Indeed, the 414X's fate may be very much "about time," as the timing of Tamiya's new car plans could be more important than any of the design particulars.

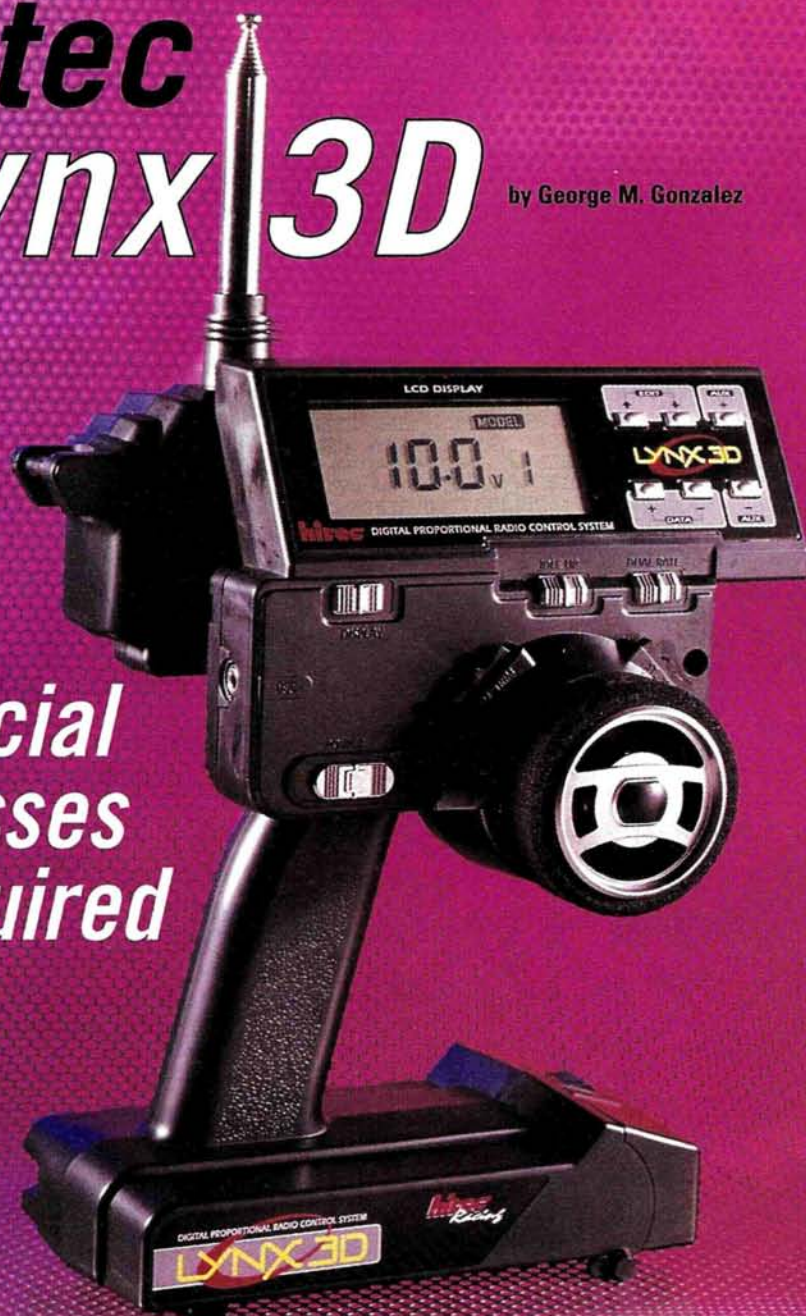
While the TRF 414X has to be more efficient than the TA03, there is the possibility of a cruelly ironic shift in the tide of popular touring-car technology if the Associated TC3 hits the track with a perceived (if not demonstrable) performance advantage. If that happens, the dual-belt standard for touring-car drive trains could get the shaft—pun intended.

**Addresses are listed alphabetically in the Index of Manufacturers on page 209. ■*

Hitec Lynx 3D

by George M. Gonzalez

*No
special
glasses
required*



Not wanting to neglect those racers who might be progressing through the ranks and may soon be shopping for a radio system to help them bridge the gap between sportsman and expert, Hitec* set out to design a radio specifically for more advanced racers. The new Lynx 3D represents Hitec RCD's first computer-controlled, FM pistol-grip radio system for expert-level drivers. With its unique automatic dual rate (ADR) feature and the included DCX dual conversion FM receiver, the Lynx 3D has already sparked the interest of many of the factory racers.

I have used the Lynx 3D for the past three months to help with some of my "Thrash Tests" and have become quite familiar with it. Here's the lowdown on the 3D's features, functions and performance.

FEATURES

3-channel FM digital proportional system: throttle, steering and auxiliary channels. The auxiliary third channel can be used to operate a remote needle valve on a piston-powered vehicle, a servo-actuated rear wing and many other devices.

Removable frequency module: both 27 and 75MHz versions are available, and the Lynx 3D is compatible with Hitec's soon-to-be-released Spectra 75 synthesized module. Read the "New Era in RF Modules" sidebar for information on this exciting option.

Right- or left-hand operation: the Lynx 3D can easily be converted for "southpaw" operation.

8-cell Ni-Cd battery pack and AC trickle-charger: expensive options on many other comparable radio systems.

External charging jack: Ni-Cd battery pack can be charged while in or out of the transmitter.

Direct servo control (DSC) patch cord: allows the radio to control the receiver and servos directly without sending an RF signal.

Wheel-tension adjustment screw: increases or decreases steering-wheel tension.

Brake-depth adjustment screw: limits brake-lever travel.

Bright yellow adhesive sure-grip tape: can be applied to the transmitter handle to provide more comfort and a better grip (not shown).

Low-battery warning: a tone sounds when the Ni-Cds can no longer produce enough energy to safely operate the R/C system.

Digital trims: digital trim levers are used throughout—no mechanical dials or adjustment pots.

LIFE WITH THE LYNX 3D

I've had my Lynx 3D for the past few months, and it is now my primary radio system. I have three electric cars and two nitro-powered vehicles programmed into the radio's computer memory. To operate and program it, simply press the Edit up/down keys simultaneously, and you will arrive at the first menu screen, which displays the steering and throttle EPA adjustment options. Press the AUX plus/minus keys to select the channel that you want to adjust, then press the Data plus/minus keys to make the adjustments. When you've finished adjusting the EPA, press the Edit up/down keys to scroll to the next feature.

After you've programmed some of the more basic features, you'll find that you can pretty much leave the instruction manual at home because the Lynx 3D is extremely user-friendly. You will need to do a little experimenting, however, to master the ADR, adjustable travel limit and ABS brake features, but even the more advanced features are easy to adjust once you understand how they work.



The Lynx 3D comes equipped with Ni-Cds and an overnight AC battery charger—expensive options on other radio systems. The Ni-Cd battery pack slips into a cassette, and the whole enchilada slips into the battery compartment.

NEW ERA IN RF MODULES

Hitec will soon release its new Spectra 75 synthesized 75MHz RF module that will make selecting and changing frequencies much easier and possibly more affordable. The Spectra 75 can operate on any frequency you wish, as long as you have the corresponding RX crystal installed in the receiver.

Since the module will be tuned to every frequency in the 75MHz band, you'll be able to use crystals from one end of the frequency spectrum to the other without any degradation in signal strength. So why hasn't anyone thought of this feature before? Synthesized RF modules actually have been around for a long time in the airplane R/C segment (and are available on some of Hitec's high-end model aircraft radio systems), but until now, this technology has not been applied to surface R/C applications.



The RF module is easy to remove and is available in either 27 or 75MHz models. Hitec's soon-to-be-released Spectra 75 module will be an option on the Lynx 3D, and you'll never have to buy TX crystals again.

HITS

- Packed with features.
- 10-model memory.
- Dual-conversion DCX receiver included.
- Ni-Cd TX batteries and charger included.
- Great direct-servo-access feature.
- Balanced, comfortable feel.
- Excellent value (lowest priced 10-model-memory computer radio).
- Very useful automatic dual-rate feature.

MISSES

- Steering wheel is too close to the transmitter case. The foam grip can slip off and rub against the steering-wheel base, and that can prevent the wheels from centering properly.
- All the racers I showed the Lynx 3D to loved its features and its overall "feel," but many commented that it just doesn't look as polished as some of the other high-end radios on the market.
- When stored in the radio's 10-model memory, R/C cars are only assigned a model number (can't spell out a name).

DIRECT ACCESS FUNCTIONS

These features can be easily accessed and adjusted via external switches or digital trim levers that are conveniently located around the transmitter case. The LCD display automatically calls up the menu for the particular adjustment, and all the values are shown as percentages.

Throttle trim: adjusts the neutral point between the throttle and brakes. The digital trim lever is located above and to the left of the steering wheel.

Steering trim: adjusts the neutral point of the steering servo. The digital trim lever is located above and to the right of the steering wheel (opposite to the throttle trim).

Idle-up switch: located directly above the steering wheel. This feature is primarily

used when first starting a nitro engine. Typically, when a nitro engine is started for the first time, it's cold and has a tendency to stall. The system works like a choke and increases the throttle until the engine warms up. Simply program the percentage of throttle increase you want (0 to 50 percent), and every time you start the engine, slide the idle-up switch to the right to increase throttle. Once the engine has warmed up, flip the switch back to the left to turn off the idle-up feature.

Dual rate (D/R): used to increase or decrease the servo travel. Digital trim levers, located on the handle just off to the left of the throttle trigger, increase or decrease servo travel. The D/R switch located to the right of the idle-up switch is used to toggle between the "normal" and automatic dual-rate modes. The lower

digital trim lever marked "ATL" adjusts the throttle/brake travel. The upper digital trim lever marked D/R adjusts steering travel in either the normal or the automatic dual-rate mode, depending on how you set the D/R switch. Slide the switch to the right to make normal dual-rate adjustments, or slide it to the left to make subtle adjustments to the previously stored automatic dual-rate settings.

ATL brake (adjustable travel limit): sets how much braking power is applied when the brakes are fully engaged.

Display switch: allows programming without sending an RF signal; used with the direct servo control feature.

ELECTRONIC FEATURES

The following features are user adjustable by accessing the menu on the large LCD screen and scrolling through the various adjustment possibilities. To access the menu, simply press down on both Edit up/down keys simultaneously. Use the Edit up/down keys to scroll through the menu, and use the Data plus/minus keys to change the data in the selected menus.

10-model memory: stores the settings for up to 10 R/C cars.



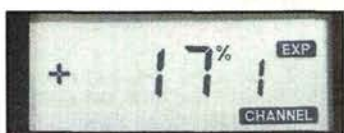
Model copy feature: copies the settings from one of the preexisting R/C car programs to another model number.



End-point adjustment (EPA): allows independent left and right steering-throw adjustment and independent throttle and brake-travel adjustment.



Exponential: increases or decreases steering and throttle sensitivity; basically changes the servo's control travel from linear to non-linear.



Automatic dual rate (ADR): a Hitec exclusive; check out the "Automatic Dual Rate Explained" section (above right) for a more complete description.



ABS brakes (anti-lock braking system): an invaluable feature for gas and electric racers alike. With the ABS feature on, every time you apply the brakes, the ABS system quickly engages and then disengages the brakes in a pulsating manner. The result is more control during braking, and that means you'll be able to go into the corners faster and apply the brakes later without spinning out or losing control. The point at which the ABS system takes over is adjustable, as are the speed of the pulse and the depth of the servo movement.



Timer: set the timer to count up to check how much run time your car is getting, or have it count down to simulate a 4- or 5-minute race. A tone will sound every minute until the clock reaches the final 10 seconds, then it counts down the remaining seconds.



Five-position programmable third channel: a five-step, incremental, non-centering third channel can perform various servo-actuated tasks.

Auto-save feature: by waiting 2 seconds store settings in memory for the main screen with battery voltage level to reappear on the LCD before you go on to make the next adjustment.

AUTOMATIC DUAL RATE EXPLAINED

The Lynx 3D features a unique ADR adjustment that, once mastered, can help dramatically lower your lap times. In a nutshell, here's how it works:

The throttle trigger's total forward travel is divided into two zones. Zone 1 represents low to medium speeds (zero to half-throttle), and zone 2 represents medium to high speeds (throttle squeezed halfway or more). The user can program the transition point between the two zones and the percentage of total steering throw that the steering servo will have when the trigger is squeezed and passes through each zone.

Racers can use this feature to gain high- or low-speed steering according to input from the throttle trigger. For example: let's say that your car pushes (understeers) under power but spins out (oversteers) when you let off the throttle to enter a corner. In this case, you would program zone 1 to provide a little less steering travel and zone 2 to provide a little more steering travel. In the event your car does the opposite—oversteers at high speeds and understeers at low speeds—you would program zone 1 to provide a little more steering travel and zone 2 to provide a little less steering travel. Determining the transition point between zones 1 and 2 and programming the total percentage of steering throw that each zone provides takes a little experimenting, but it's well worth the effort because you'll be rewarded with a car that's easier to drive.

DUAL-CONVERSION GLITCH-PROOFING

The Lynx 3D is equipped with Hitec's DCX dual conversion (negative shift) FM 3-channel

receiver. This unit is becoming popular with top drivers, and for good reason: it's designed to be virtually glitch-proof. Hitec claims that the receiver works so well that it will operate better than most other FM receivers, even with the transmitter's antenna completely collapsed. The DCX receiver has two filters instead of one to provide crystal-clear reception even in a crowded racing environment.

The receiver uses special Dual Conversion crystals that are easily identified with a purple

stripe on the frequency tab, while the transmitter uses regular Hitec FM TX crystals (of the same frequency as the RX crystal, of course). Both regular FM TX and DCX Dual Conversion RX crystals are available separately, and that

makes pairing up crystals an easy task. The frequency crystals are also

much less expensive than comparable brands of FM crystals, making the DCX system a bargain. The 75MHz negative-shift version also works with all Futaba FM radio systems, and a positive-shift DCX model is available for Airtronics, KO and JR FM transmitters. There is also a universally compatible 27MHz version for all systems.



FINAL SAY

The Lynx 3D is Hitec's first computer-controlled pistol-grip radio system and it looks as if the Hitec engineers achieved their goal. They've produced an affordable radio that's feature-packed, easy to operate and offers excellent reception. Some of the more prominent racers have already noticed the Lynx 3D, so don't be surprised if you see Hitec RCD appearing in winners' circles around the world.

*Addresses are listed alphabetically in the Index of Manufacturers on page 209. ■

Trinity and Yokomo Win Reedy Invitational Touring Car Race of Champions

The Reedy Invitational Touring Car Race of Champions was a huge success and turned out to be one of the most well-attended racing events of the year. Team Trinity/Team Losi drivers David Spashett of Great Britain, Joel Johnson and Josh Cyrul were all in attendance along with Yokomo drivers Masami Hirosaka of Japan and Barry Baker. Team Kyosho flew in a team of racers to compete at the event, and five talented drivers from the U.S. and Japan represented Tamiya; they all competed with prototype dual-belt 4WD Tamiya cars. Team Schumacher and a host of battery and motor companies also had teams gunning for victory at the Open and Invitational class championships.

Team HPI driver Tony Phalen took TQ honors in the Stock Touring class, but Team Losi driver Richard Trujillo picked up the win in the Main to claim the championship. Team Orion/Team Losi driver Jimmy Jacobson claimed the TQ in the Modified Touring class, but his car broke in the Main, and that gave Dominic Favorito a chance to win the championship. Team Trinity/Team Yokomo factory driver "Fabulous" Barry Baker won the highly competitive Invitational class after barely edging out his teammate Masami Hirosaka—his closest competitor. We'll provide an expanded race feature in an upcoming issue of *R/C Car Action*, so stay tuned.



Mike Reedy congratulates Barry Baker on winning the Invitational class.

Monster-size 4WD Traxxas truck coming soon

This isn't exactly a racing news flash, but it certainly is big news (and heck, maybe they'll race these things). Word on the street is that Traxxas is building a Clodbuster/USA-1/Juggernaut-size 4WD monster truck. Not much is available in the way of specifics, but here's what we do know: the truck will be nitro-powered, equipped with a 2-speed tranny and will feature fully independent suspension with 8 oil-filled shocks. We've been told that a prototype is being tested now and that the truck is actually fast. If you've ever seen the big 4WD electrics run, you know they aren't too quick. The only picture Traxxas released is of the transmitter (gee, thanks a lot!), but wait a minute; is that a third-channel switch? We'll keep you posted.



Tamiya Championship Series (TCS) Update

Tamiya has recently made some changes to its popular TCS series that will officially take effect in the year 2000. The most exciting change is the addition of the new Le Mans (LM) class to the TCS roster. The class is designed for the F103 chassis-based Toyota GT-One TS020 and 911 GT-1 '98 LM cars only; that is to say, no F101- or F102-chassis conversion cars will be allowed to race, and the cars must use the kit stock rubber tires. This new class will replace the TCS GT-2 class (4WD with 24-degree stock

motors), one of the smallest classes at the TCS.

Tamiya will continue to run the GT-2 class throughout the rest of the '99 season, and the class will also be offered at the TCS Nationals toward the end of the year. Another important change to the F1 class is that in the future, all cars competing in the TCS must be equipped with Tamiya Type-A rubber slicks—no more foam tires. Foam tires will be allowed for the rest of the '99 season, but rubber tires must be used at the nationals and world championships.

RACER TIP OF THE MONTH

■ Mark Pavidis Team Associated factory driver



Here's a tip for Yokomo MR-4TC sedan racers who compete at events where AMB lap-counting systems with transponders are used to keep track of lap times. Make a transponder mount from a piece of thick Lexan and use servo tape to install it directly behind the battery pack, as shown in the photo. This helps to balance the weight across the chassis more than when the transponder is secured to a Lexan mount, inside the foam bumper, where many racers choose to place it.

The only materials you'll need to make the transponder mount are a 1.25x1.5-inch piece of Lexan, servo tape, one adhesive-back body mount foam spacer, a body clip and a tapered ream to make a 3.5mm hole to mount the transponder.



RACER news

INNOVATOR AT WORK

Ernie Provetti

The partnership between Trinity and Team Losi; the new Team Losi 2WD off-road buggy; and the introduction of the new Panasonic 3000mAh Ni-MH cells are among the hottest news stories to break in recent times. That's why we decided to visit with Trinity/Team Losi's Ernie Provetti—who was actually one of the first innovators featured in "Racer News"—to gain insight into these important new ventures.

R/C Car Action: What were some of the events that made you decide to purchase 50 percent of Team Losi?

Ernie Provetti: We tried to buy out Team Losi several times in the past, but it always entailed our buying the entire company outright. This led to some stumbling blocks; mostly, seller's remorse on the part of "Pops" Losi—and cold feet on mine. It would have been too big an undertaking for me to take over the entire process. This time, with an equal partnership, everything was much simpler; fewer attorneys were involved. Knowing that "Pops" and Junior are still going to be active in the company is very reassuring to me. In addition, I felt that Trinity needed a presence on the West Coast, and my being here accomplished that as well.

Perhaps the biggest reason for the partnership is that I really feel strongly about Team Losi and the things that they do. I mean, look at its new line of Certified Shock Fluid; what company would invest eight months and major capital into test equipment to make sure that its shock oil is perfect? It's this kind of perfection that sets Team Losi apart, and it's this kind of perfection that I want to be associated with.

RCCA: What role will you be taking in the company? What are some of your short- and long-term objectives?

EP: My main roles will be in sales and marketing; I will be taking over all the advertising issues and trying to build a better sales network for Losi. Our short-term objective is to look at the company's advertising schedules and see where we're strong or weak. Our long-term goal is to build a sales and manufacturing network where we can have more product to ship on a timely basis and educate the consumer more about Team Losi.

RCCA: Will Trinity influence how Team Losi's products are designed and developed?

EP: I'm not going to be involved in any of the design work or the development of new products because that's not my area of expertise. I think that Team Losi has the best engineering staff in the industry, but they haven't had anyone who could explain their achievements to the media and to consumers. I hope to fill that responsibility myself.

An idea I've brought to the table is for the

company to get more involved with entry-level stuff that's geared toward grassroots racers. I hope they'll embrace this idea; I think Pops knows it's important and wants to get more involved in that area.

RCCA: We're all for more programs for first-time racers. In your opinion, are other manufacturers heading in that same direction?

EP: I think that many R/C manufacturers, including Trinity, have really dropped the ball in this area. We've tried to do some Street





Spec racing and things like that, and it has worked regionally, but we haven't been able to make it work on a national basis. I think that all manufacturers need to focus on this issue and try to build that bridge again so we can get new people into the hobby.

RCCA: Will you be managing Trinity from your home office on the West Coast, or do you plan to log thousands of frequent-flier miles in the next couple of years traveling between the coasts?

EP: In this age of email and fax machines, I'm involved in just about every single decision at Trinity. And for one week every month, I will fly back to the East Coast to visit Trinity. That means I'll be spending three weeks of each month at Team Losi. My presence is needed at both companies, and Trinity is an integral part of my life, so I want to be there.

RCCA: Let's shift gears and talk about the new Panasonic Ni-MH cells. It was only a matter of time before nickel-metal-hydride technology became available for R/C racing—and not just to power our receivers. In your opinion, are these new batteries the future of R/C?

EP: You mean, are the new cells just a shameful attempt by Trinity to make more money? Sorry; for some reason, I have that Nike TV commercial that co-stars Spike Lee on my mind. Why is it that this type of advertising is acceptable for companies like Nike but not for companies like Trinity? Seriously, these new cells *will* change the way R/C cars are raced in this country—and probably the world. The Panasonic 3000 Ni-MH cells represent the cutting edge in nickel-metal-hydride technology, and they offer the highest voltage that has ever been established for this type of cell. Their old drawbacks—that they have a low cycle life and can be easily damaged by overcharging—aren't concerns any more.

Ni-MH cells have no memory, so you can use the same battery pack to compete in an 8-minute, $\frac{1}{12}$ -scale race, and then use them in a 4-minute, off-road race. There's no longer any need for deep discharging or dead shorting. And probably the best thing about these cells is that anybody will be able to go to a hobby store, pick up a pack of them and get a minimum of 500 seconds of run time from that pack—discharged at 20 amps or less.

RCCA: When the RC 2000 batteries were introduced, many racers despaired because they had to face replacing all of their expensive 1700mAh battery packs with the latest in battery technology, just to remain competitive. The new cells are a much more dra-



David Spashett's domination of the '97 Worlds is surely one of Ernie's favorite Trinity victories. No need to say "cheese"!

matic leap in capacity. How do you anticipate racers will react?

EP: People don't like change; it's a simple fact. But if changes don't take place, the hobby will stagnate. Conventional Ni-Cd cells start out with a big boost of power at the beginning of the discharge curve, usually the first 30 seconds or so, then the voltage falls off and eventually deteriorates. The Ni-MH cells start off with less voltage but maintain a more consistent voltage throughout the discharge, and in most cases, the Ni-MH cells provide a higher average voltage level than Ni-Cds.

Here's an example of how racers can benefit by using these cells. We all know that 8-minute, $\frac{1}{12}$ -scale cars require "feather-light" trigger control to finish a race successfully without dumping. In most cases, these cars are not fun to race because you feel like you can't even punch it once to make a pass without the risk of dumping toward the end of the race. Basically, you never know if your driving strategy will pay off until the last 15 seconds of a race because motor, tire and gear-ratio selection is so critical.

At a recent $\frac{1}{12}$ -scale race, Josh Cyrul went out and absolutely pounded on his car for 9 $\frac{1}{2}$ minutes using the Panasonic Ni-MH cells. He had power to spare, and that made the race more fun. That's what these batteries represent: people having fun. What a unique concept!

Stock racers will benefit as well because they'll be able to gear higher and get the same results they were getting with Ni-Cds. Another thing we've noticed is that for some reason—we haven't quite figured out why yet—electric motors seem to run cooler when they use Ni-MH cells, even when the cars are geared higher.

RCCA: Do you believe that the cells will become ROAR- and IFMAR-legal soon?

EP: I really can't comment on that. My message to the organizations would be, "Try to see the spirit of what this product represents, and forget the name 'Trinity.'" The new cells cost the same as the RC 2000 cells, so there is no price increase for the consumer. What the consumer gets for his money is more power and more run time, so why shouldn't these cells be legal?

RCCA: Trinity recently acquired the Titan Tech line. What's happening there?

EP: In a way, the Trinity/Titan Tech relationship is very much like the Trinity/Team Losi relationship. Titan Tech does the manufacturing; Trinity does the promotion. We're currently working on a new heat-sink cooling head for .12-size engines and some machined-aluminum suspension components for the HPI RS4 Pro 2. Raul Herrera is the guy behind Titan Tech; he's a racer, an excellent machinist and an all-around nice guy. Together, we're working to produce good products.

RCCA: The IFMAR Off-Road World Championships are right around the corner; in fact, they'll be taking place at almost the same time as this interview is published. Can you predict who might win the 2WD and 4WD classes? What are the chances of Team Trinity winning back-to-back championships?

EP: It will probably come down to four or five drivers. Kinwald will be a force; you can never count him out, and Matt Francis could surprise everyone again. Jukka Steenari, Masami Hirotsuka and Mark Pavidis will all be very much in the game. I'd love to see a back-to-back championship for Trinity and Team Losi, but you can never tell.

RCCA: The new Team Losi buggy looks very interesting; have the lucky few who have driven it given you their impressions of it?

EP: The suspension geometry was tested on a Double-X platform to make sure that things worked, but no one has tried a tooling-up version yet. The team has been testing various links, geometry settings, etc., to get to the point where we can start the tooling. So far, the car has done very well, and we're sure the production version will be even better. Gil Jr. has done very well with the car; he was actually 8 seconds faster with the prototype car than with his regular car, and that's a giant improvement in anybody's book.

RCCA: Thank you for your time, Ernie. My best to you and your family, and good luck with the new Team Losi and Titan Tech ventures.



RACER news

Speed Shop

Ballistic Clothing R/C Bags

We have padded cases to protect our transmitters, duffel bags to carry our R/C gear to and from the track, and we even have nylon suitcases to hold cardboard boxes full of parts, but no one has offered a case for the vehicles themselves—until now. The folks at Ballistic Clothing listened to racers and came up with an innovative way to safely transport your R/C cars and trucks.

The new R/C Bags look very similar to the transmitter bags that many of us use to protect our radio systems, but they're bigger and have more padding to provide maximum protection. Ballistic Clothing makes its R/C Bags to house R/C cars of various sizes; the R/C Bags shown here are for 1/10-scale trucks and 1/8-scale buggies.



Notice the cutout on the 1/8-scale version that allows the wing to protrude when the bag is zipped up. Ballistic clothing also has R/C Bags for 1/10-scale touring cars and for other popular racing cars, as well as for battery chargers. Call Ballistic Clothing for more information on sizes, colors and prices.

Ballistic Clothing, 1104 Emery Wood Ct., Ste.

D, Las Vegas, NV 89117-9062; (702) 240-9216; fax (702) 240-9218.

Tactyl Center Differential for the HPI RS4 Pro 2

We showed you Tactyl's* innovative new torque-sensing limited slip differentials (LSDs) for 1/10-scale nitro and electric vehicles in the June issue of *R/C Car Action*.

Equipped with an internal centrifugal clutch, this new diff represents a totally new concept in ball-differential design. The folks at Tactyl are at it again and have come up with another innovative product that looks very interesting: the new center differential for HPI and Yokomo vehicles that's designed to replace the stock center layshaft and drive pulleys with a center (third) torque-sensing ball differential. The center differential includes a new center layshaft, drive pulleys and everything that's needed for a quick installation.

The center differential works like Tactyl's front and rear torque-sensing diffs, but instead of balancing the traction between the left and right tires, it equalizes the traction between the front and rear ends of the car. In short, if the center differential senses that the front end of the car is receiving more traction, it redirects more of the motor's power to the rear of the vehicle to balance the traction. This new diff should be very useful for racing on slick surfaces with modified motors. Stock racers may not benefit from this unit, though, because it adds considerable weight to the drive train. As soon as we get our hands on a sample, we'll pass along pricing, part numbers and some general driving impressions. In the meantime, feel free to call or email Tactyl for more information.



Trinity and Titan Tech Go Touring

Trinity just announced that Titan Tech will soon release a line of machined-aluminum suspension and chassis components for the popular HPI RS4 Pro 2 that will be sold under the Trinity banner.

Titan Tech master machinist Raul Herrera showed us prototypes of the new front and rear shock towers and a heat-sink motor plate; all are machined-aluminum with purple anodizing. These parts are just the beginning; many more machined-aluminum parts are in the works.

Since the Pro 2 is well under the ROAR and IFMAR minimum weight, most racers have to add a ton of ballast—usually coins, globs of solder, or lead weights—around the chassis to make the minimum weight requirements. The new machined-aluminum parts are slightly heavier than the molded components but are much stronger and more rigid; welcome traits on an R/C car. If you need to add weight, why not do so with stronger parts?

Titan Tech is also working on a new heat-sink head for .12-size engines that represents an all-new, cutting-edge design. The new head is machined from solid billet-aluminum stock and features a starburst fin design that is unique. The heat-sink head is actually the brainchild of master mechanic and racer Ron Rossetti of Team Losi; he designed the head to provide superior heat dissipation without over-cooling the engine, so it can maintain its optimum running temperature. As soon as these products become available, we'll pass along more information.





RACER news

Speed Shop

Craftsman 3 in 1 Rolling Workshop

We usually don't feature products unrelated to R/C in "Speed Shop," but I'm making an exception this month because this product is just too cool. The Craftsman 3 in 1 Rolling Workshop has three individual sections that stack one on top of the other to form a base that converts into a rolling cart. The individual sections can be easily removed for transportation and reassembled in seconds when you reach the track. The cart features rugged pneumatic tires for rolling over rough terrain and a telescoping handle for easy carting.

The upper section is a 19-inch-long, portable toolbox with removable tray that easily holds larger items like chargers, tires, etc. The mid-

dle section has two full-width drawers with removable dividers, and the lower section is a huge flip-out bin that's perfect for storing large accessories such as power supplies, soldering irons, plastic-parts organizers, etc. The Rolling Workshop also features a removable reel that holds up to 50 feet of 14-gauge extension cord (sold separately). If you'd like to check one out and kick its tires, visit your local Sears, Roebuck store.

Part no.—965346 (Craftsman 3 in 1 Rolling Workshop); price—\$69.99.



RACER PROFILE

SCOTT HUGHES

Aside from being a very talented driver, Team Associated/Pro-Line factory driver Scott Hughes has one of R/C's most comical personalities, and that's probably why he's so popular at the track. Although Scott has mellowed slightly over the years, he's still known for his ability to find all the hot spots in town when he's attending races across the country and around the world. Let's let Scott speak for himself; maybe he'll reveal to us at last how he got the nickname "Squirrel."

VITAL SIGNS

Age: 23

Occupation: Expediting and materials coordinator for Pro-Line

Hometown: Redlands, CA

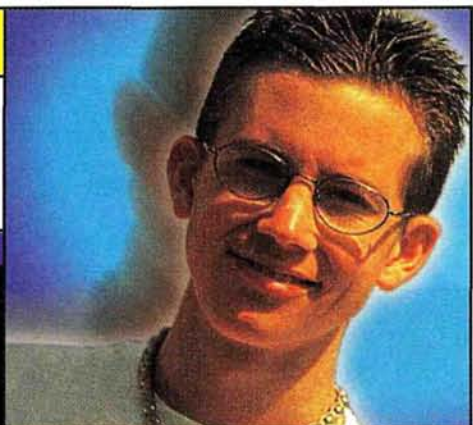
Years racing: 9

First R/C car: Associated RC10

Favorite racing class: 2WD off-road

Favorite track: Lake Park, FL

Sponsors: Pro-Line, Associated, Reedy, KO Propo, MIP, M-n-M Hobbies and Yokomo



R/C Car Action: How did you become hooked on R/C racing?

Scott Hughes: I was at school one day when a friend showed me *R/C Car Action* magazine. I was flipping through the issue when I came across the best-ever Team Associated ad: you know, the one where it looks as if a real off-road car is leaping off the page at you? Anyway, I had asked for an RC10 for my 13th birthday, and as luck would have it, that's just what I got. It took me about a week to get the thing together, and a few weeks later, I found out that they actually raced these things at the Ranch Pit Shop in Pomona, California. The Ranch isn't around anymore; sob. At that time, the races were only 3 minutes long, and it's a good thing because that Panda charger I had could barely handle it.

RCCA: How long did it take you to move up from the sportsman ranks to the point at which you started competing at an expert level? Also, how much time did you put into the hobby to get to that level?

SH: It took me about a year. I think I was noticed for the first time at the '91 NORRCA Nats, where I think I finished in fourth in Mod Truck and second in 2WD Expert Stock, both in the A-mains. During that time, I raced twice a week.

RCCA: At what point in your life did you decide that you wanted to go "pro" and seek a career in the R/C hobby?

SH: When I finished high school. I had asked a good friend of mine, Mike Reedy, for a job in the motor department at Team Associated. I went down to Associated for an interview with Mike and Gene [Hustings], and they decided to give me a shot. At that time there were no "pro drivers," at least none that were being paid.

RCCA: Do you excel at any other activities besides R/C car racing?

SH: The one thing that stands out in my mind is the fact that I'm a hard worker and very dedicated to Pro-Line. Todd Matson, Tim Clark and Reb Smith are always giving me new projects and challenges, and I'm never afraid to dive headfirst into my work or ask questions. I'm always on the move and look forward to going to work with Jason Ruona, Tim, Todd, Reb, Mary Johnson, Tracy Malone and last but not least, Mercy Ramos.

RCCA: I've noticed that many of your racing buddies refer to you as the "Squirrel"; how did you inherit this nickname?

SH: When I first started working for Associated everyone noticed that I was, well, a little out of control. Daren Westman first called me "Squirrel," and for some reason, it just stuck. I've been called Squirrel ever since then.

RCCA: Which drivers do you like to travel to new places and compete with at major events?

SH: OK, here goes: Richard Saxton, Mark Pavidis, Jason Ruona, Billy Easton, Jimmy Jacobson, Jimmy Babcock, Frank Gomez, Scott Brown, Mark Francis, Matt Francis, Brice Beaver, Greg Hodapp, Sohrab Tavacoli, Richard Trujillo, Frosty St. Clair, and if I missed anybody, I'm sorry.

RCCA: You've been working at Pro-Line for a few years now; in your opinion, what are some of the most important things you've learned there?

SH: I've learned how to be patient and how to communicate better with others. This has given me the confidence to talk to new people and share ideas during meetings. Oh, and I can build a mean foam rack.

RCCA: Are you doing anything special to prepare for the IFMAR Off-Road Worlds in Finland?

SH: Actually, I plan to practice as much as possible at M-n-M Hobbies and just make sure that I have everything I need for the long trip.

RCCA: Do you have any predictions about who will win each class? Do you think anyone has a chance to win both titles in the same event?

SH: Well, I'd like to think that I could win the 2WD class, but as a betting man, I'd put my money on Mark Pavidis in 2WD and Masami Hirotsuka in 4WD.

RCCA: What does the future hold for the "Squirrel"? Anything exciting happening on the horizon?

SH: I just plan to continue working hard for Pro-Line and do my best at the upcoming races this summer.

RCCA: Thanks for the interview, Scott. Good luck at the Worlds.



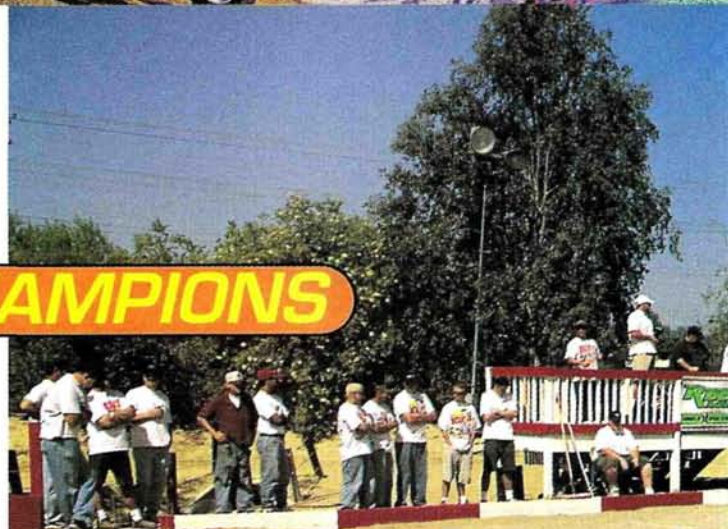
RACER news

REEDY

TRUCK RACE OF CHAMPIONS

The Reedy Truck Race of Champions is the only large, organized racing event dedicated to off-road truck racing and the only event that offers racing classes for both nitro and electric vehicles. This year's event was hosted by Hot Rod Hobbies in Saugus, CA, and its staff did a fantastic job organizing what turned out to be the largest Reedy Truck Race to date.

Four racing classes were offered at the event, and they were all heavily attended. Reedy Modifieds provided the handout motors in the Stock Truck class, but it was "anything goes" in Mod Truck. The Factory Truck class featured many R/C celebrities so, as expected, the competition was extremely close. The Gas Truck class was the "showcase" event and although the class was open to all contestants, the A-main finalists were some of the most talented drivers in the world.



OVERVIEW

■ **GAS TRUCK.** Four 7-minute qualifiers determined the grid order, and a 60-minute A-main event separated the boys from the men. Team Associated factory driver Billy Easton picked up the TQ with a 22/7.06.68, which was 2 seconds faster than his teammate Mark Pavidis, who qualified second. A 60-minute A-main event becomes a battle of attrition because the trucks are enormously abused, and tire wear is an important consideration. After several pit stops, Team Associated driver Greg Degani and Pavidis remained on the same lap and even swapped positions several times. Easton fell back in the pace while Team Associated drivers Jason Jakubczyk, Chad Bradley and Richard Saxton all fought for third. As it turned out, Degani was able to fend off Pavidis long enough to take the win with a half-track margin, and Pavidis claimed second. Jakubczyk won the battle for third.

■ **FACTORY TRUCK.** Racers competed in four, 4-minute qualifiers and triple A-mains. Team GM/Team Losi driver Jimmy Babcock barely edged out Team Trinity/Team Losi driver Brian Kinwald for the TQ in this class. In fact, less than 1/100 second separated the drivers' best times. Even the track computer had difficulty figuring out the winners in this class because a different driver won each of the three triple A-mains. Babcock won the first, Team Losi driver Adam Drake won the second, and Billy Easton won the third. After the scores had been tallied and the throw-out rounds factored in, Drake emerged victorious. Easton ended in second place while Kinwald, who had two second-place finishes, settled for third.

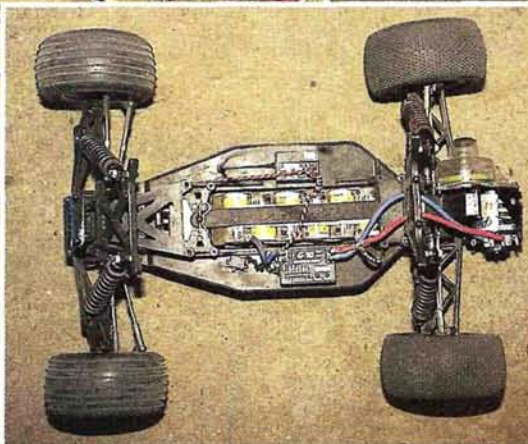
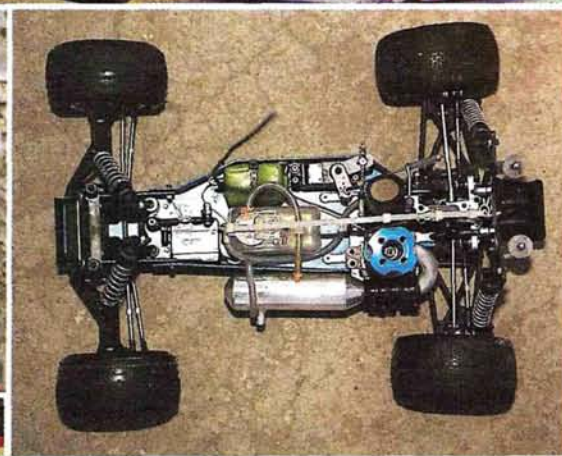
■ **MODIFIED TRUCK.** Four 4-minute qualifiers and triple A-main



Team Associated co-owner Gene Hastings (left—but do I really need to point Gene out?) congratulates Greg Degani on winning the Gas Truck A-main event. Associated's RC10GT just keeps going, and going

events settled the scores in this class as well. Jason Jakubczyk was the man to beat, although Team Orion driver Justin Morrison was looking pretty hot too. Jakubczyk picked up the TQ but it wasn't easy, as Morrison's best time was less than 1 second slower. Jacob Thome won the first Main driving a Losi Double-XT GP; Joey Stanovich, also driving a Double-XT GP, won the second Main and TQ, and Jakubczyk picked up the win in the third. Once again, the track computer was called upon to

PHOTOS BY: GEORGE M. GONZALEZ



Above: Greg Degani's Gas Truck class-winning Associated RC10GT; even after the 60-minute A-main event, it still looks new.

Left: Jeremy Kortz' Stock Truck class-winning Losi XX-T.

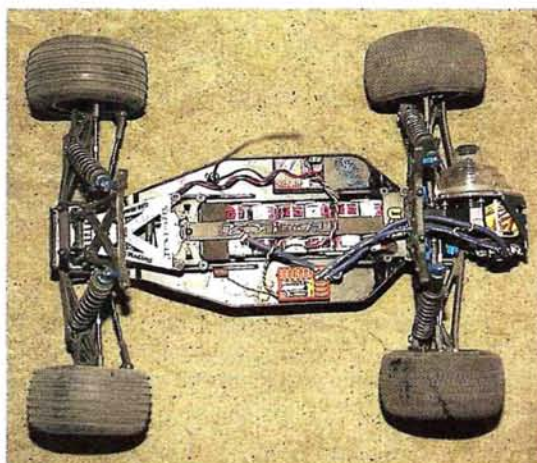
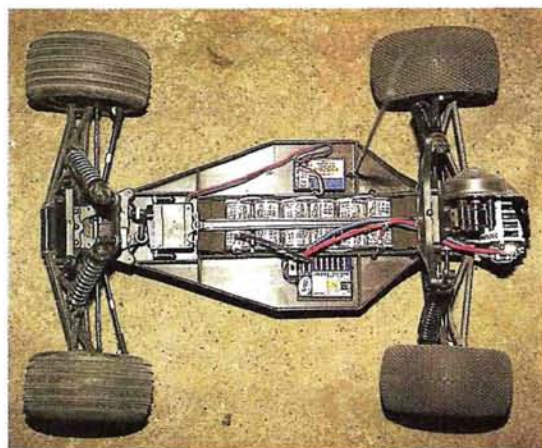


Team Associated factory drivers Richard Saxton (left) and Mark Pavidis kick back and watch one of the Mains. Little chilly, Mark?

figure out the finishing order. Jakubczyk ended up with the Mod Truck Championship, while Thome had to settle for a close second, and Stanovich took home the third-place trophy.

■ **STOCK TRUCK.** Bad Boy Jeremy Kortz's Peak/Tekin-powered Double-XT proved to be the fastest stock truck at the event when it took the TQ by more than a 1-second margin. Once again, a different driver won each of the triple A-mains; Kortz took the first, Josh Anderson took the second

Right: Jason Jakubczyk's Mod Truck class-winning Associated T3. It's not much different from the T3s you Associated fans have at home!



Left: Adam Drake's Factory Truck class-winning Losi XX-T Graphite Plus. This is the era of the outta-the-box race-car!



RACERnews

FIN	QUAL.	DRIVER	CHASSIS	MOTOR	PIPE	FUEL
GAS TRUCK						
1	3	Greg Degani	RC10GT	Top .12	Associated	O'Donnell
2	2	Mark Pavidis	RC10GT	Top .12	Associated	O'Donnell
3	5	Jason Jakubczyk	RC10GT	O.S. CV	Associated	O'Donnell
4	9	Chad Bradley	RC10GT	Top .12	Associated	O'Donnell
5	7	Richard Saxton	RC10GT	HPI .12	Associated	O'Donnell
6	10	Brian Kinwald	NXT	NovaRossi	Losi	Trinity
7	4	Matt Francis	NXT	O.S. .12*	O'Donnell	Trinity
8	1	Billy Easton	RC10GT	Top .12	Associated	O'Donnell
9	8	Andy Smolnik	RC10GT	NovaRossi	Associated	Dynamite
10	6	Brandon Rowland	RC10GT	TTR**	Associated	O'Donnell
* Modified by Steve O'Donnell ** Thunder Tiger Racing .12BZ						
STOCK TRUCK						
1	1	Jeremy Kortz	XX-T	Peak	Ballistic	Tekin
2	5	Mike Kendall	XX-T GP	Peak	Peak	Tekin G-10
3	4	Andy Smolnik	T3	Reedy	Reedy	LRP V6
4	2	Josh Anderson	T3	Reedy	Reedy	LRP V6
5	8	Jason Jakubczyk	T3	Fantom	Fantom	LRP V6
6	7	Jacob Thome	XX-T GP	Peak	Peak	Tekin G-10
7	9	David Goss	XX-T GP	Bennett	Pro-Match	Novak
8	3	Scott Reynolds	XX-T GP	Reedy	GM Racing	Novak
9	10	Jeremy Aymar	T3	Reedy	Reedy	LRP V6
10	6	Joey Stanovich	XX-T GP	Trinity	Trinity	Novak
FACTORY MODIFIED TRUCK						
1	3	Adam Drake	XX-T GP	Race Prep	GM-VIS	Novak
2	5	Billy Easton	T3	Reedy	Reedy	LRP V6
3	2	Brian Kinwald	XX-T GP	Trinity	Trinity	Novak
4	1	Jimmy Babcock	XX-T GP	GM Racing	GM-VIS	GM V12
5	8	Chad Bradley	T3	Reedy	Reedy	LRP V6
6	6	Jason Ruona	T3	Reedy	Reedy	LRP V6
7	10	Billy Caley	XX-T 'CR'	Trinity	Trinity	Novak
8	9	Matt Francis	XX-T GP	Trinity	Trinity	LRP V6
9	7	Greg Hodapp	XX-T GP	Trinity	Trinity	Tekin G-10
10	4	Jimmy Jacobson	XX-T GP	Team Orion	Team Orion	Novak
MODIFIED TRUCK						
1	1	Jason Jakubczyk	T3	Fantom	Fantom	LRP V6
2	4	Jacob Thome	XX-T GP	Peak	Peak	Tekin
3	9	Joey Stanovich	XX-T GP	Trinity	Trinity	Novak
4	3	Jeremy Aymar	T3	Reedy	Reedy	LRP V6
5	2	Justin Morrison	XX-T GP	Team Orion	Team Orion	LRP V6
6	6	Shawn Blackwell	T3	Reedy	GM-VIS	Tekin
7	7	Bill Hagen	T3	Matrix	Integy VESC	Novak
8	5	Robert Kuhl	XX-T 'CR'	Banzai	Team Orion	Novak
9	10	Dennis Smith	XX-T 'CR'	Banzai	GM-VIS	Tekin
10	8	Mike Kendall	XX-T GP	Peak	Peak	Tekin

and Mike Kendall won the third. As it turned out, Kortz ended up with the Stock Truck championship while Kendall claimed second and Andy Smolnik—who picked up two second-place finishes—rounded out third.

FINAL THOUGHTS

The '99 Reedy Truck Race of Champions was an awesome event. It's the only race at which both gas and electric vehicles duke it out, and spectators get a chance to see both sides of the off-road racing sport. Many thanks to Hot Rod Hobbies for a



PINION/SPUR	TIRES (F/R)	RADIO	RECEIVER	BODY
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15/66	Pro-Line	Futaba 3PJ	Futaba FM	Pro-Line Chevy
15/64	Pro-Line	Airtronics M8	Airtronics	Pro-Line Chevy
15/66	Pro-Line	Airtronics M8	Airtronics	Associated
15/66	Pro-Line	Hitec 3D	Hitec	Pro-Line Chevy
15/66	Pro-Line	JR R1	JR	Protoform
18/76	Losi	Airtronics M8	Airtronics	Losi
19/75	Losi/Pro-Line	Airtronics M8	LRP Phaser	Losi
15/66	Pro-Line	Airtronics M8	Airtronics	Associated
15/66	Pro-Line	Airtronics M8	Futaba	Associated
15/66	Pro-Line	Airtronics M8	Airtronics	Associated

22/88	Losi	JR R1	JR-Propo	Losi
22/88	Pro-Line/Losi	Airtronics M8	Airtronics	Losi
17/87	Pro-Line	Airtronics 3PS	Futaba	Associated
17/87	Pro-Line	Airtronics M8	Futaba	Pro-Line Chevy
20/87	Pro-Line	Airtronics M8	Airtronics	Associated
21/88	Pro-Line	Airtronics 3PS	Tekin TFM	Losi
21/81	Losi/Pro-Line	Airtronics M8	Airtronics	Losi
20/88	Pro-Line	Airtronics CX2P	Airtronics	Losi
18/87	Pro-Line	Airtronics M8	Airtronics	Associated
21/88	Losi	Airtronics M8	Hitec DCX	Losi

19/88	Losi	Airtronics 3PS	Novak XXL	Losi
18/87	Pro-Line	Airtronics M8	Futaba	Associated
NA	Pro-Line/Losi	Airtronics M8	Airtronics	Losi
20/88	Losi	Airtronics M8	Airtronics	Losi
17/87	Pro-Line	Hitec 3D	Hitec DCX	Pro-Line Chevy
18/87	Pro-Line	NA	NA	Pro-Line Chevy
18/88	Losi	Airtronics 3PS	Airtronics	Losi
20/88	Losi/Pro-Line	Airtronics M8	LRP Phaser	Losi
19/88	Losi	Airtronics M8	Airtronics	Losi
19/88	Losi	Airtronics M8	Novak XXL	Losi

18/87	Pro-Line	Airtronics M8	Airtronics	Associated
18/88	Pro-Line	Airtronics 3PS	Tekin TFM	Losi
18/88	Losi	Airtronics M8	Hitec DCX	Losi
18/87	Pro-Line	Airtronics	Airtronics	Associated
20/87	Losi	Airtronics 3PS	Airtronics	Losi
17/87	Pro-Line	Airtronics M8	Airtronics	Associated
17/87	Pro-Line	Futaba 3PJ	Novak	Associated
18/88	Pro-Line Edge	Airtronics M8	Airtronics	Losi
NA	Losi/Pro-Line	Airtronics	Tekin TFM	Losi
21/88	Pro-Line/Losi	Airtronics M8	Airtronics	Losi



The top three Gas Truck A-main winners, from left to right: Mark Pavidis (second place), Greg Degani (first place) and Jason Jakubczyk (third place).



The Stock Truck class's top three A-main winners, from left to right: Mike Kendall (second place), Jeremy Kortz (first place) and Andy Smolnik (third place).



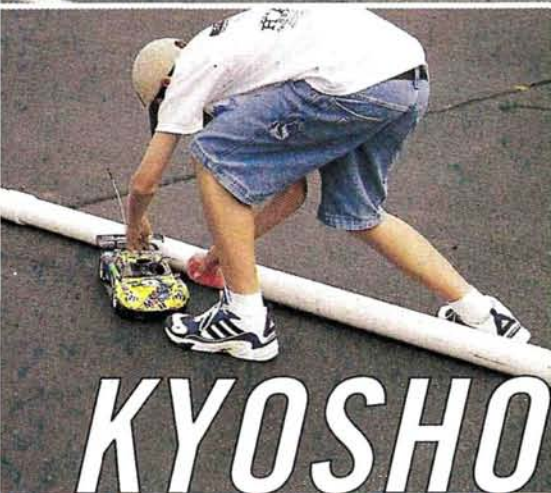
Factory Modified's top three A-main winners, from left to right: Billy Easton (second place), Adam Drake (first place) and Brian Kinwald (third place).



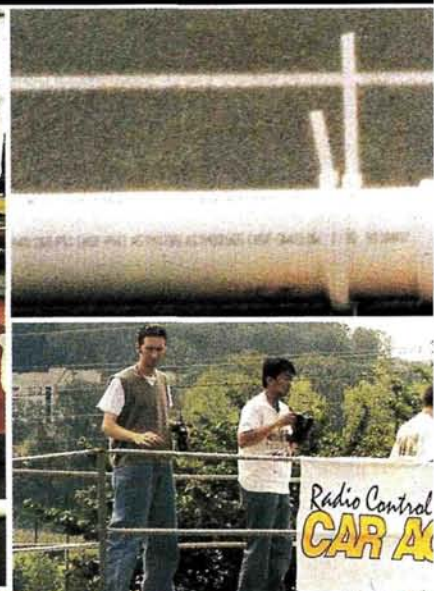
The top three Modified Truck A-main winners, from left to right: Jacob Thome (second place), Jason Jakubczyk (first place) and Joey Stanovich (third place).

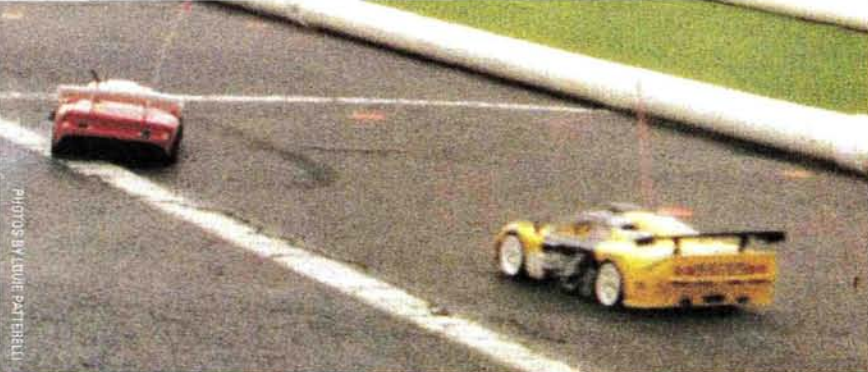
great job hosting the event and to Mike Reedy for all his support. Congratulations to Greg Degani, Jeremy Kortz, Adam Drake and Jason Jakubczyk, the '99 Reedy Truck Race Champions, for their success. Hope to see you all there next time.

*Addresses are listed alphabetically in the Index of Manufacturers on page 209. ■



EAST COAST R





PHOTOS BY LOUIE PATTERELLI

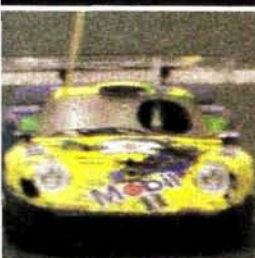
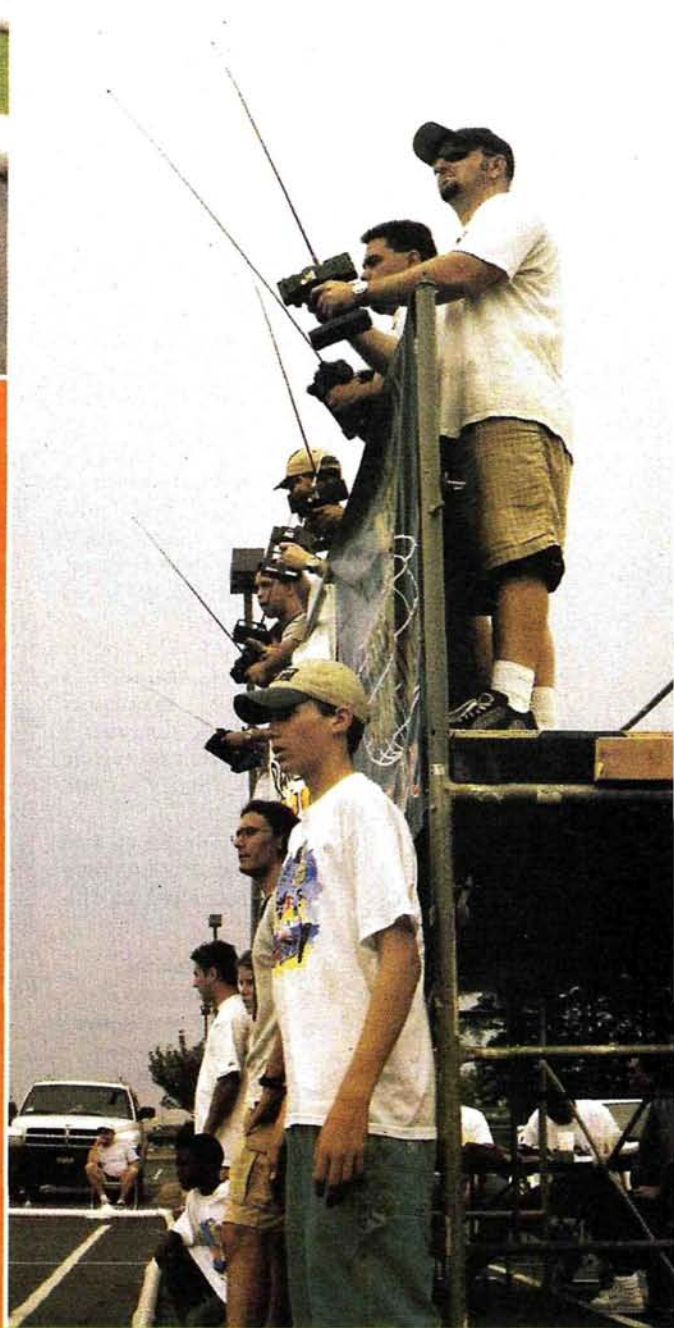
Georgia on their minds

by Louie Patterelli

THE KYOSHO WORLD CUP is one of the most exciting events in R/C car racing. Here in the U.S., with nitro-powered cars, team endurance racing with mandatory driver changes and pit stops is not your average day in the parking lot.

Hosted by Hobbytown USA in Kennesaw, GA, this year's East Coast Regional Kyosho World Cup showed that Kyosho's format offers a unique and exciting form of racing, and with 12 teams battling for the chance to go to Hawaii and take on the world, you know the competition was fierce.

REGIONAL



EVENT FORMAT

The action-packed qualifiers saw mostly clean driving; I don't think anyone wanted to risk being in the 11th position. Consistent driving was the key to a good position on the grid for the Main, and no one exemplified smooth and steady more than the team of Ivanovic and Shao. No matter which driver held the transmitter, their car seemed to move through traffic effortlessly. It was no surprise that they TQ'd with a 27-lap run in 10:16.61.

Three 10-minute qualifiers determine the racers' starting positions in the Mains. The top 10 teams advance to the A-main, and the rest run in B, C, D, etc., Mains. The A-main lasts 1 hour, and there are two mandatory pit stops/driver changes.

THE MAIN

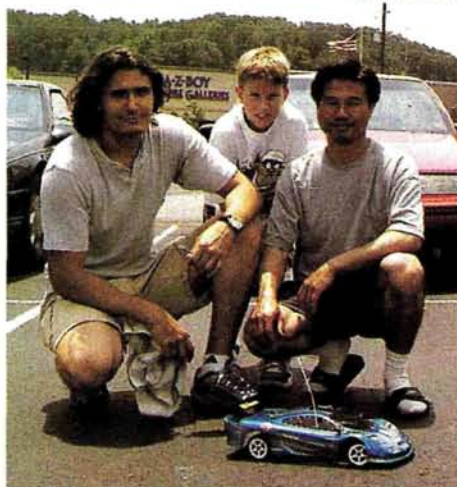
At the starting tone, the blue McLaren F1 GTR of TQ's Ivanovic and Shao took the lead, and they never looked back. The battle was for second between the Iannone/Peterson and Casey/Bevel teams, and the cars swapped places on nearly every other lap.

Around lap 10, the Casey/Bevel duo seemed in control, but Iannone and Peterson managed to keep them in their sights. The position changed again when the Casey/Bevel team pitted for a driver change, leaving the other two to move up with a smooth change of their own.

After the first driver change, someone noticed that the race clock had accidentally been set for 30 minutes instead of 60, so they decided to stop the race at the half-hour mark and start a second 30-minute segment for the finish.

For the second half, the cars were returned to the

Dan Palmer thrashes on a loose rear A-arm during the second qualifier.



Winners Aleks Ivanovic and Roland Shao pose with R.J. and their winning car.



The second-place team of Iannone/Peterson.

On lap 54, the leaders had a problem that kept them in the pits for three laps, dropped them to third and moved Iannone/Peterson and Goddard/McGee up to first and second places, respectively.

With less than 4 minutes left, Ivanovic and Shao were down almost a lap, but they turned it on! Four laps after rejoining the melee, they reeled in the second-place car and started to gain on the leader. Pressure took its toll on Iannone/Peterson: they made a grand effort, but a couple of infield mishaps were their undoing. With less than 2 minutes left, Ivanovic and Shao cruised by and never again looked back.

Thanks to Bill Murray (no, not that Bill Murray), the owner of Hobbytown USA, who hosted and organized the event with the help of race coordinator Fernando Gordino. Fernando just happens to be a team driver for Corally. For their help with scoring, the "nice guys" award goes to Jeff and Andy Thompson of the Echeconnee Super Speedway in Macon; they hauled their trailer full of equipment all the way to Kennesaw just to help out. Racers helping racers is what our hobby is all about!



grid in the same positions as they had held when the race was stopped.

Ivanovic/Shao again set the pace, and for the first few laps, second place was hotly contested by three cars until the Iannone/Peterson pair took the position and ran away; Goddard/McGee settled into third.



The first-place car of team Ivanovic/Shao.



The second-place car of team Iannone/Peterson.



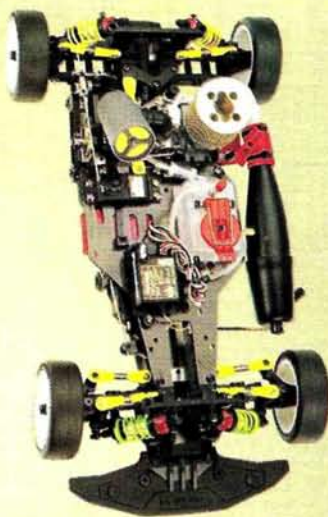
No podium finish for this car, but the paint job deserves a prize.

BRING YOUR OWN SPIDER!

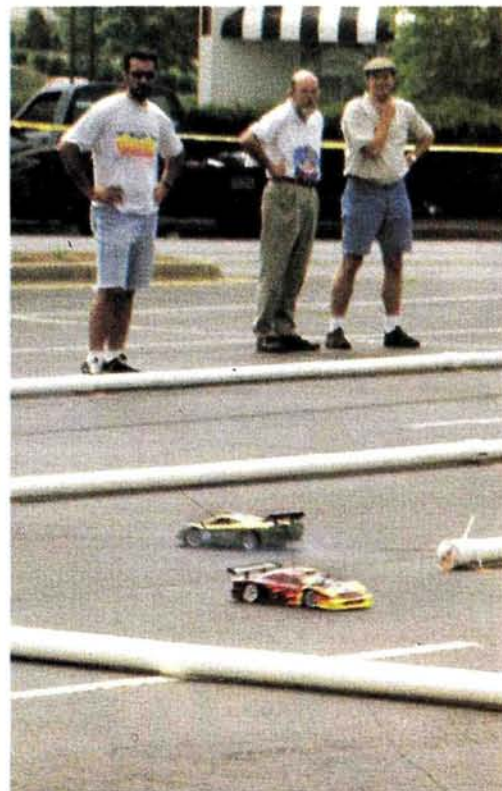
Do you have a Kyosho GP Spider and want to join in the fun at a Kyosho regional event but don't want to spend a bunch of money on hop-up parts?

There are parts meant more for style than performance that you could do without and still be very competitive; some parts offer more "bang for the buck" than others. Below are what are considered to be the most effective option parts for the Spider. By adding these parts, you should be competitive with even the most hopped-up Spider, even if your car doesn't look quite as trick as you blow by!

- Tuned-pipe set and coupler.
- Fuel filter.
- Special main chassis.
- Racing slicks and wheels.
- Front universal joint drive shafts.
- Ball diffs or steel bevel gears.
- Hard suspension arms.



Here's a fully loaded Kyosho Spider GP. You could purchase all of these hop-ups individually, but Kyosho offers a World Cup edition kit that includes most of the options you see here for less dough than it takes to buy a stock car and all the goodies.



The action is always close and exciting in "single-brand" events such as the Kyosho World Cup.

THE ULTIMATE PIT SP



When you pull up the Team Serpent Network web site you pull into gas racing's ultimate pit space. Browse the on-line version of our 80-page, 200-photo Tech Book – a virtual gas car bible that puts 20 years of tuning know-how at your fingertips. Join the Cyber-Pit, a unique interactive web page where racers from around the world share tech information. Download our exclusive START datalogging software...for free. Or read the latest tuning tips in columns by the current World T.Q., the ROAR Champion, and other experts. TSN – get it dialed up, and get your car dialed in.

CLASS: GP SPIDER MKII

FIN.	QUAL.	DRIVER	RADIO	CLUTCH BELL	GLOW-PLUG TYPE
1	9	Ivanovic/Shao	Futaba 3PJ	12-16	Kyosho
2	3	Iannone/Peterson	KO Propo Mars EX1	12-16	Kyosho
3	7	Goddard/McGee	Futaba 3PJ	12-16	O.S. no. 8
4	4	Trak/Kitt	NA	NA	NA
5	1	Higby/Galante	NA	NA	NA
6	6	Bogus/Beasley	Futaba 3PJ	12-16	Fox
7	2	Grady/Bruce	NA	NA	NA
8	5	Higgins/Palmer	KO Propo Mars EX1	12-16	O.S. short
9	10	Haigwood/Martinez	KO Propo Mars EX1	12-16	O.S. short
10	8	Higby/Galante	Futaba 3PJ	12-16	Stock

All drivers used Kyosho GP Spider MKII chassis, Kyosho GS11R engines, Kyosho pipes, DuraTrax Red Alert fuel and Kyosho tires.



Congratulations to the winning team—nice work!

FINAL THOUGHTS

This was one of the most exciting races I have ever attended. Kyosho can be proud of what it has started.

Those who competed have a lot to be proud of: they all drove a clean and friendly race. Thanks to Bill Murray, Fernando Gordino and the hospitable crew at Hobbytown USA. The winners go to Hawaii; everybody else gets to go home and prepare for next year! So congrats and aloha to Aleks Ivanovic, Roland Shao and their pit helper R.J. Harder. Good luck at the World Finals. Now, if I can just get R/C Car Action to let me cover the Worlds in Hawaii!

*Addresses are listed alphabetically in the Index of Manufacturers on page 209.

CE IS IN CYBERSPACE



www.serpent.nl

Serpent
EXCITEMENT IN THE FAST LANE

As much as I enjoy building and racing hardcore competition cars, there's a lot to be said for race-tuning vehicles that really weren't meant to carry a transponder around a bunch of PVC pipes. I'm sure you old-timers remember the challenge of transforming your Frog or Hornet into an RC10-beater (or trying to, anyway), and half the fun of the early sedan scene was learning the tricks to make a converted Manta Ray into a real blacktop screamer. With similar pioneer spirit, I decided to take one of Tamiya's* most entertaining recent releases—the budget-friendly and nearly inde-



structible Baja Champ—and transform it into a 4WD-class competitor. Even if the car isn't able to take on the big boys when the project is complete, I'll certainly have fun trying to get it there!

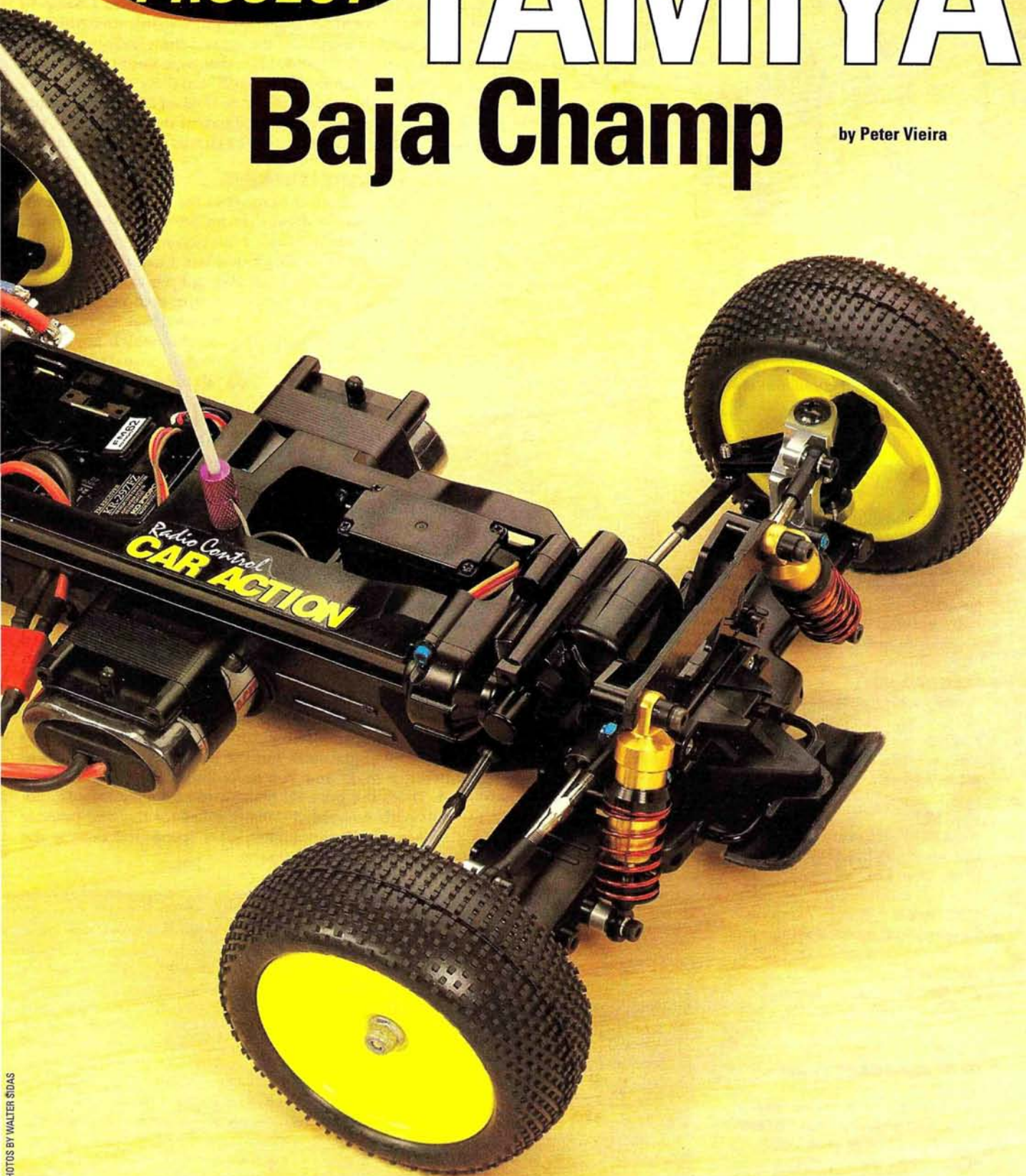
THE CHAMP

PROJECT

TAMIYA

Baja Champ

by Peter Vieira



PHOTOS BY WALTER SIDA

HITS THE TRACK



Tamiya's ball diffs and hollow carbon gear shafts increase the precision of the trannies. Unfortunately, the heavy ball diffs eat up the weight savings of the hollow shafts. I plan to install Tamiya's lightweight aluminum diff parts later.

TAMIYA

- Manta Ray ball diff set (2)—part no. 53070.
- TL01 carbon propeller shaft—OP-323.
- Hollow-carbon gear shaft—OP-322.
- TL01 bearing set—53292.
- Aluminum hub carriers—53226.

EAGLE RACING

- Tuning spring set—1167.

KYOSHO

- 4WD wheels—W5026 (narrow), W5027 (wide).

PRO-LINE

- Tires (F/R)—8185M3 (4WD Holedshot LP)/8184M3 (Hole Shot LP).

KIMBROUGH

- Neon-yellow molded wing—331.

DURATRAX

- 3-inch Competition shocks (2 pairs)—DTXC3500.

TRINITY

- D3 13x2 modified motor—D3213.
- Off-Road Racer's Screw Box (assorted blue screws)—RC6067.
- VIS EX-tra Sport Tech 2000 stick pack—VXS2006A.

TEKIN

- G-12c ESC—1112.

JR RACING

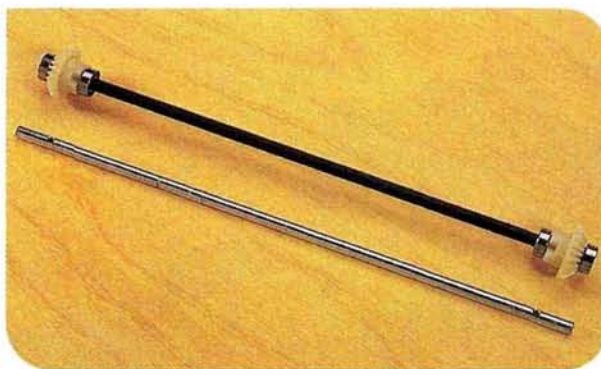
- Premium Race servo—Z550.

CHASSIS PREP

Before I began my project, I performed a complete teardown on the Baja Champ to clean it. I also looked for any parts I could eliminate (to trim weight), strengthen, or otherwise improve. I didn't find much; I buzzed off the unused front body-post bosses with a Dremel* tool, snipped off some small molded fins that were meant to protect a mechanical speed control's resistor, and removed the small dorsal fin that serves as a motor guard. I also removed the small shelf that is meant to hold an ESC. When setting up a TL01, I usually use the shelf to hold the receiver and mount the ESC under it, but in this case, I wanted to mount the electronics as low in the chassis as I possibly could.

TRANSMISSION CHANGES

I had previously installed a mix-and-match set of bearings in the Baja Champ, but for total precision and minimum maintenance, I decided to replace them with Tamiya's rubber-sealed set. In addition to the required 24 no. 1150 bearings, the bearing set includes hollow gear shafts to replace the kit's solid stock shafts. I had plans to install Tamiya's optional hollow-carbon gear shafts, and curiosity got me wondering: how much lighter were these parts? A visit to the *R/C Car Action* super-zoot weighing scale



A good chunk of weight can be removed from the Champ by replacing the heavy steel drive shaft with the much lighter graphite version. Be sure to install bearings when using the lightweight shaft.

revealed that the four stock shafts (which are apparently constructed of depleted plutonium) weigh in at 20.1 grams, while the hollow steel shafts more than halve that figure at 7.08 grams. But the hollow carbon shafts really defy gravity at 2.5 grams—that's a healthy 17-gram weight savings over stock. Another massive hunk of steel was junked when the stock propeller shaft hit the wastebasket with a 32.6-gram wallop, and its carbon replacement floated

into place at just 6.2 grams. If you have a TL01 you'd like to lighten, get these parts!

Sometimes, higher-performance parts add weight instead of remove it, and this was the case with my final transmission addition: a pair of Manta Ray ball diffs. The bevel-gear stockers weigh in at 25.3 grams each, but the ball units tip the scales at 35 grams. Multiply the difference by 2, and you're looking at an additional 19 grams of rotating mass—ugh. That's the price I'll have to pay for silky-smooth, no-lag diff action. I built the diffs with Associated* Stealth lubes for the best possible diff action and applied a little Aero-Car Technology's* Super Speed Gear Lube to the gears for minimum friction and maximum smoothness.

No car gets the green light for full-on thrashing until the photos are in the can, and the Project Champ was no exception. Staff photographer Walter Sidas and I blasted out of the office early to point a lens at the car, and the local BMX track was once again the venue of choice. After Walter burned a few rolls of film, I cut loose with some big air and berm-railling turns. I didn't want to tear up the car too much since I had plans to race it the next day, but it was impossible to resist squirting the Champ over massive sets of doubles for smooth backside touchdowns. Mostly smooth, anyway; I cased my share of jumps, but the Baja Champ always came back for more. I dumped a couple of packs as the sun went down; I was confident that the Champ would hold its own on a real racetrack.

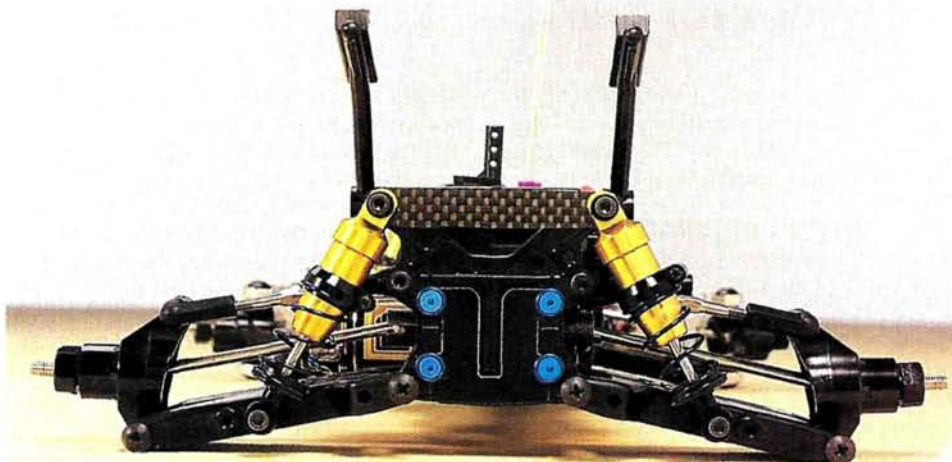
The next day, I rolled the truckster into R/C Madness in Enfield, CT, for the weekly club race, and the Project Champ got its share of looks and questions. "That's 4WD? Where are the belts?" and "You really gonna race it?" were some common themes. All agreed that the car looked pretty good, and a Tamiya buggy on a racetrack was a welcome thing. The car was looking good in the first qualifier; although it pogo'd badly over bumpy sections, I was stoked that the car could clear the doubles, and I noted that it tracked well with just a little push.

"I'll just add softer springs," I thought to myself, "and I'll be dialed for the second qualifier." Moments later, the fun soured when the left front dogbone snapped at the hub; this made the car pull hard every time I got on the gas. I limped through the final minute of the race, knowing full well that I would not be able to buy a replacement dogbone. However, there was nothing to stop me from running the car with 2WD, so I yanked out the front

SUSPENSION MODS

My first mission in the suspension department was to eliminate slop. Because of the Champ's long suspension arms, a little bit of play at the inboard hinge pin translates into significant movement at the hubs. The problem was exacerbated by deformation of the bores in the arm mounts; hard jumping and general abuse caused the holes to ovalize slightly at the ends. As prescribed by our own "R/C Doctor" in this very issue, I resized the arm mounts by filling them with two-part epoxy then sliding a silicone-lubricated hinge pin into the hole. After I had allowed the glue to cure overnight, I slid the hinge pins out, and this left a perfect-size, zero-slop bore. Cool.

Next, I addressed the Baja Champ's damping—or lack thereof. The kit's friction shocks offer almost no damping action and are undersprung; this results in chassis slap when you land anything burlier than mild jumps. Tamiya makes gem-like aluminum units that are a direct fit, but I decided to save a few bucks and go with DuraTrax* Competition shocks. They're offered as 3-inch fronts and 4-inch rears, but the Champ's short, integral shock towers call for shorty "front" shocks at both ends. To mount them, I used the stock mounting



DuraTrax Competition Shocks are a classic hop-up. You can also see the graphite brace I hacked out of an old RC10L chassis, the RPM heavy-duty rod ends and the Trinity blue screws I used to dress up the chassis.

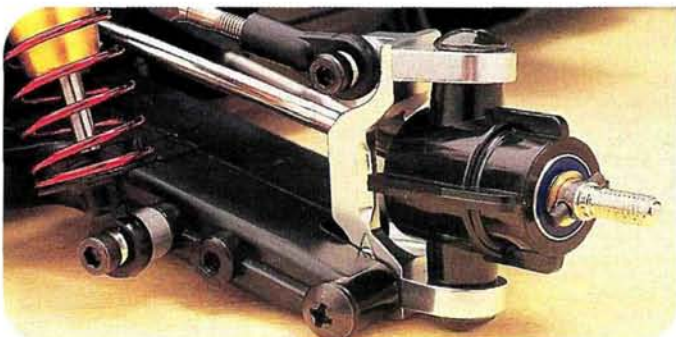
holes but eliminated the Tamiya shoulder-screws in favor of 3mm Allen screws. The shocks' lower eyelets feature installed pivot balls that are ready to accept the screws, but spacers were needed up top; I used Kyosho* shock spacers. The shocks are mounted well inboard on the arms, and the arms have quite a bit of leverage; stiff springs are required. I installed a set of Eagle Racing's* "super hard" blue springs in the rear, and used "medium" reds up front. For damping, I used 40WT Losi* Certified fluid in the front shocks and 60WT out back. I know that sounds heavy for off-road, but the pistons included with the shocks are slotted instead of "holed," and the slots are fairly large. I needed a bit more damping than usual to cope with the heavy springs, and the heavy stuff felt right.

To strengthen the shock towers so they

would cope better with the demands of the fortified suspension, I cut braces out of an old graphite chassis. The pieces simply bridge the upper shock mounts, and they feel effective; I tested them with the ever-popular "Can-I-bend-it-with-my-thumbs?" method.

While the car was apart, I looked for a means of adding caster to the front end; out of the box, the Baja Champ has zero caster, and that makes the car less stable in the turns than it could be. My first thought was to install Cross aluminum hub carriers, and these do fit the Champ's arms, but they do not allow full suspension travel. Tamiya's aluminum front hub carriers (originally designed for the "TA"-series sedans) add 10 degrees of caster without inhibiting arm movement.

To complete the suspension mods, I replaced the fixed, plastic camber links and tie rods with a set of titanium turnbuckles. Robinson Racing* titanium ball ends were threaded into the rear hubs, steering knuckles and bellcranks, and Kyosho rod ends were attached to the shock towers and front hub carriers with



Tamiya's beautifully finished hub carriers add 10 degrees of caster to the Baja Champ's front end.

end internals, installed softer springs all around and went out for the next heat. This time, the Project Champ spun out with the slightest squeeze of the throttle at any speed. I decided to drive off the track and let everyone else race without having to blow by me each lap, but track owner and announcer Chris Marcy encouraged me to stay on the track and "do some tricks"—code for "hack on your car." And hack I did, as I looped out on every pass at the doubles. For the third qualifier, I tried to fix the excessive steering problem by installing the stiffest springs I had on the front and putting the softest springs on the rear. It barely helped, and to add insult to injury, I stripped the hex out of one of the rear wheels. I don't quit racing unless the car simply cannot move, so I decided my only chance was to run the Main with front-wheel drive. I thrashed furiously in the pits to convert the car from rear-wheel drive, and just made it to the Main. At the start tone, the Champ took off with an ugly snapping sound as the drive shaft's front bevel gear ingested its own teeth. The car



crackled through a quarter lap before the gears were completely annihilated. Fun! I resolved to repair and bullet-proof the Baja Champ for another outing the following weekend.

Fast forward to the next weekend for some hot laps at Xtreme Raceway in Brookfield, CT. With my rebuilt, resprung Baja Champ, I had the driving experience I had envisioned when I began the project. Hard landings still bottomed the car severely, but as long as I caught some back side, the car took jumps in stride and was easy to drive fast. Although no match for the dedicated race-cars, the Baja Champ hung in there well enough to be competitive. After testing, the car was given a thorough thrashing as I jumped the berms and made repeated runs at the rhythm section. As long as the Champ isn't asked to handle the Trinity motor's horsepower through the front gearbox alone, it holds up like a ... well, like a champ.

formance

3mm cap-head screws. I used RPM* ball cups to mate the turnbuckles to the Robinson ball ends for a lightweight, strong and fully adjustable suspension.

ELECTRONIC CHOICES

I originally built the Baja Champ with a reversing ESC and inexpensive AM radio gear, but I wanted something racier for the "Project" car. I installed a JR Racing* "Premium Race" steering servo and a Tekin* G-12 ESC to handle the steering and throttle duties, while my trusty KO Propo* Mars handled the signals. I installed the ESC in the very bottom of the chassis, and I taped the Mars tiny KR-197 receiver to the



A Tekin G-12c is nestled deep in the chassis. The FET tabs line up nicely with the hole meant for the kit's original mechanical speed control resistor, allowing cooling air to flow over the ESC.

battery tunnel. Speaking of that tunnel, it accepts only stick packs. No problem; Trinity* offers excellent matched cells in assembled stick packs, and that's what I slid into the Champ's chassis. I also used Trinity horsepower in the form of a D3 13-double mod, which I installed with the kit-supplied 19-tooth pinion, the smallest pinion compatible with the TL01B chassis' three motor-mounting holes (21- and 23-tooth pinions can also be fitted, but they aren't good choices for a mod motor coupled to a transmission that was originally designed to spin small wheels with mild motors). I was concerned that the Trinity pack's stock Tamiya connector might melt when subjected to the motor's big amp demands, so I replaced it with a Deans* connector. To accommodate the stick pack, I also wired up the G-12 in a 4-wire configuration.

RUBBER

The Baja Champ's stock tires are hard-compound spiky jobs that look killer, hook up great on backyard-ish surfaces and wear like iron, but they don't deliver the best traction on a real, off-road R/C track. Pro-Line* rubber got the nod, and I mounted Holeshots all around. The Champ's stock rims will accept the tires, but I wanted a classic race look so opted

for Kyosho Lazer rims; these may be mounted without modification.

BODY AND WING

My buddy (and *Model Airplane News* assistant editor) Bob Hastings supplied cool "Project" decals via a Roland* Stika machine; gotta love the Stika. Because the graphite front shock tower brace prevented the body from reaching the body post, I attached the front of the shell with screws. That might seem like a hassle, but remember: you can change packs in the Baja Champ without removing the body. I dumped the kit's Lexan wing in favor of a Kimbrough* molded unit. I like the molded-in color of the K-wing, but its billboard side dams are a bit funky looking. I trimmed them into a more eye-pleasing shape with a pair of body scissors and a Dremel tool.

FINAL THOUGHTS

Although my Project Baja Champ won't match the best 4WD buggies, I still consider it a total success. I had a great time building it, it looks cool, and I don't think I own anything that's more fun to drive. This is a car that can't lose—even if it doesn't win!

*Addresses are listed alphabetically in the Index of Manufacturers on page 209.

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Dynamics of Damping

by the Staff of R/C Car Action

Perhaps no other component of an R/C car is as misunderstood—or as important to its handling—as the “shock absorber.” What most racers and enthusiasts don’t realize is that to properly suspend the car for the track conditions of the day, the suspension’s springs must be matched to a restraining (or *damping*) force. It’s not rocket science, but there is a lot of misinformation out there. This article will give you the facts about damping and includes the lowdown on a new product that will help you exploit your master’s degree in damping.

TERMS **Viscosity:** the degree to which a fluid resists flow under an applied force. In R/C, viscosity is described as a “weight”; thicker, more viscous fluids are “heavier.” The more viscous a fluid is, the more resistant it is to flow.

Damping: not to be confused with *dampening*, which means “making slightly wet” and has nothing to do with suspension systems. Damping is the resistance generated by a damper (in R/C, dampers most often take the form of a piston forced through a fluid-filled cylinder—commonly known as a “shock absorber”). In physics, “to damp” is to decrease the amplitude of a wave; in this case, the wave-form describes the oscillation of the suspension’s springs.

Centipoise: 1/100 poise. A poise is a unit of viscosity equal to one dyne-second per square centimeter (a dyne is a centimeter-gram-second unit of force, equal to the force required to accelerate a 1-gram mass one centimeter per second). To super-simplify, a centipoise is a unit of measure for viscosity, and the measurement is derived by calculating the force required to accelerate an object through the fluid.



DAMPING DEFINED

Consider the pogo stick: a classic example of an undamped spring. When you jump onto a pogo stick, you compress its spring, storing energy in it. The spring then releases that energy, propels you into the air and goes on to the next store/release cycle. Springs are very efficient; they release almost all of the energy they have stored. A damper controls the release of energy; an everyday example of a damper is the gas cylinder that prevents a spring-loaded screen door from slamming shut. What is commonly referred to as a car's "shock absorber" is actually the damper—typically, a fluid-filled cylinder with a piston inside. The force required to push and pull the piston through the fluid is the damping force. Without some type of damping, a car's suspension springs would release virtually all the energy they store after compressing over a bump. That would cause the car to rebound into the air, just like a pogo stick.

COMPRESSION AND REBOUND DAMPING

Although they operate on the same basic principle, the dampers used in full-scale racing suspension applications are considerably more complex than those used in R/C. Through complicated valving, the typical full-scale vehicle's damper can be set to provide more damping force on the compression



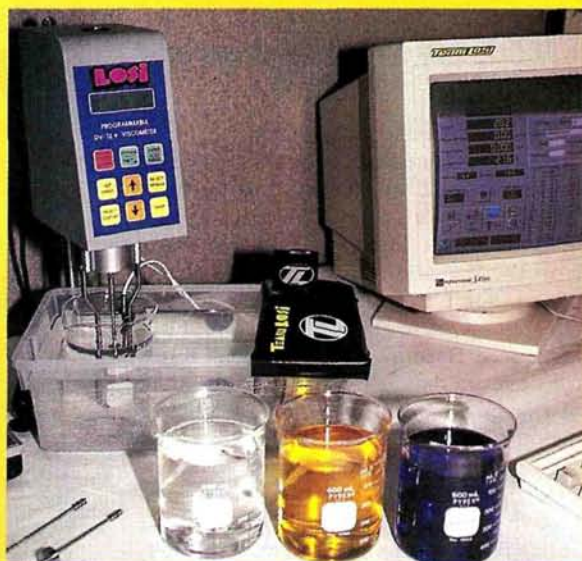
This is the essence of fluid damping: a piston is pushed and pulled through a fluid-filled cylinder. By altering the surface area of the piston and/or the viscosity of the fluid, the force required to move the piston through the fluid can be adjusted.

Some pistons are slotted or notched, while others feature holes of varying diameters. There are many theories about which design works best; whether more, smaller holes are better than fewer, larger holes, etc., but all are effective ways of adjusting the force required to move the piston through the damping fluid.



sion stroke and less damping force on the rebound (extension) stroke. R/C dampers' simplified design provides the same amount of damping on the compression and rebound strokes. This makes for an interesting tuning challenge: the damping force must be light enough to allow the suspension to compress quickly but strong enough to restrain the "pogo" effect of the spring's rebound. If there's too much damping, the shock will "pack up." This means the spring cannot extend the shock before another bump/jump landing/cornering load provides a compression force, and the shock settles into a narrow range of movement that prevents it from operating effectively. If the damping is too light, the spring will be able to compress quickly in response to bumps, but it will rebound harshly and cause the car to lose traction and may contribute to bottoming over jumps. R/C car manufacturers who are serious about racing spend countless hours determining the best overall damping and spring-rate settings for their cars, so always start with the suggested setup.

LOSI'S SHOCK-ABSORBING SECRETS



No, this is not some sort of computerized cookie-dough blender; it's a very precise, computerized viscometer that is used to test the viscosity of fluids. Team Losi's engineers use the system to test the viscosity of the Certified Silicone Shock Fluid to ensure that the bottle of shock fluid you bought today will be exactly the same as the bottle of shock fluid you're going to buy, one month—or one year—down the road.



In a controlled environment, Team Losi's quality assurance engineer, Brandon Upshaw, uses the viscometer to test a batch of shock fluid. Only the highest-quality Pyrex beakers are used in the testing. To ensure accurate readings, the oil is heated and then cooled down during testing.



These are 55-gallon drums of silicone oil in several primary weights. The oil is then mixed, dyed and tested on the viscometer before the fluid is packaged and sent to the hobby distributors.

PHOTOS BY GEORGE M. GONZALEZ

ADJUSTING DAMPING FORCE

The amount of resistance an R/C car's fluid damper provides is determined by two factors:

1. The viscosity of the fluid in the damper (the "weight" of the "oil" used to fill the shock).
2. The surface area of the piston.

Viscosity is changed simply by pouring more viscous ("thicker" or "heavier") or less viscous ("lighter," "thinner") fluid into the shock. Piston surface area varies with the size and number of holes in the piston. Some pistons do not use holes at all; some Kyosho shocks have slotted pistons, and Hammad Ghuman's VLT pistons feature flats machined into the sides of the piston. All are means of altering piston-surface area. The less surface area, the less force is required to move the piston through the fluid in the damper. Likewise, the less viscous the fluid is, the easier it is to move the piston through the fluid.

CONSISTENCY COUNTS

It's easy to keep piston settings consistent; pistons are coded by a molded-in number, the number of visible holes or slots, or by the color of the plastic they are molded in. To ensure total consistency, some racers hand-drill the piston holes so they can be certain each piston's holes are *exactly* the same size. Molded parts shrink when they cool; although designers compensate for this by precisely calculating the shrink rate and making the mold oversize, inconsistencies that top racers feel are detectable can occur in the finished shocks. Shock fluid, however, presents some unique problems, even though it is packaged by "weight."



Team Losi has expanded its line of shock fluid to include 45, 60, 70, 90 and 100WT fluids that were previously unavailable.



Team Losi has retained the commonly accepted weight numbers but ensures consistency from batch to batch by testing the shock fluid before and after each production run to ensure that each bottle is within 2 percent of the specified viscosity in centipoises at 25 degrees centigrade. A guarantee of accuracy such as this is unheard of, even in mainstream industries.

Silicone fluid suppliers usually sell the product in 55-gallon drums and in several "primary" weights that are mixed by the buyer to formulate other weights. Although most of the commercially available silicone fluid has undergone some type of standardized viscosity testing, the tolerance and accuracy of these tests are not sufficient for R/C use. The commercially accepted range of viscosity for a specific grade of fluid may be wide enough to cover several grades (weights) of Team Losi Certified shock fluid. When the commercial fluids are mixed to produce various sub-weights, the problem is compounded even further and can result in batches of shock fluid with erroneously labeled viscosities.

Obviously, inconsistent viscosity hinders accurate tuning and defeats the purpose of keeping a selection of shock fluids in your pit box. Team Losi has stepped up to fix the problem and now uses computer-controlled viscosity-testing equipment to provide a definitive, reproducible "standard" in silicone shock fluid. The Certified Silicone Shock Fluid line is the first to come with a certificate of accuracy as established by the National Institute of Standards and Technology (NIST). Why not use the more familiar SAE system? According to

Team Losi engineers, the SAE rating system is actually an outdated method of testing viscosity that is hardly used any more and bears no resemblance to the familiar 20WT, 30WT, 40WT, etc., rating system that has been adopted by the R/C industry. Rather than foist a new system onto racers, Team Losi has retained the commonly accepted weight numbers but ensures consistency from batch to batch by testing the shock fluid before and after each production run to ensure that each bottle is within 2 percent of the specified viscosity in centipoises at 25 degrees centigrade. A guarantee of accuracy such as this is unheard of, even in mainstream industries.

Team Losi Certified Silicone Shock Fluid is available in 12 weights to suit both on- and off-road racing applications. Each weight is dyed a particular color to indicate its viscosity (and looks trick if you happen to have some of those transparent shocks from Tamiya or Hammad Ghuman).

The Certified fluid is available in the following weights: 20 (blue), 25 (green), 30 (clear), 35 (orange), 40 (purple), 45 (yellow), 50 (red), 60 (blue), 70 (green), 80 (clear), 90 (orange) and 100 (purple). Some of the colors are duplicated, but this should not cause any confusion because the identically colored weights are used in different applications. For instance, the blue 20WT fluid is mostly used in off-road vehicles, and the blue 70WT is primarily used in on-road/touring-car racing. Speaking of on- and off-road racing, Team Losi also sells the shock fluid in "six packs" of viscosities that have been selected for on- and off-road applications.

FINAL THOUGHTS

There's enough physics behind fluid damping to fuel a thousand science fair projects; we've only just scratched the surface. Suspension designers must consider head-spinning calculations to determine the effects of other variables not considered here, such as shaft speed, flow patterns created by various piston shapes and orifice sizes, optimum stroke/bore ratios and more. The basics explained here should give you enough understanding to get a grip on your car's handling, and with a little experimentation, you should be better able to help your car get a grip on the track.

**Addresses are listed alphabetically in the Index of Manufacturers on page 209.*

by Derek Buono

You have just spent countless hours finishing your new R/C car—your prize possession. Every gear mates perfectly with its companion, every suspension setting is perfect, and every nut and bolt has been carefully snugged. Now it is time to put the final piece on: a body that looks as if a mouse chewed out the wheel wells and a woodpecker poked out the mounting holes. Does this describe one of your bodies? Don't be ashamed; I've seen some excellent drivers and tuners with really hack bodies. If you can't seem to get that perfect trim or the perfect hole, or a mouse really did chew the wheel wells out, then read on for tips that will help your ride look the way it should.

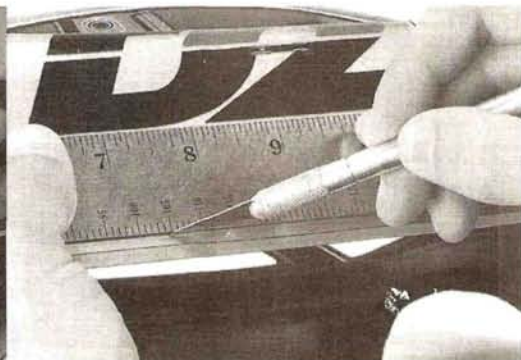
Everybody work that body!

BASIC TRIMMING TECHNIQUES

■ **Straight lines.** For short straight cuts, straight scissors work better than curved scissors. For longer cuts, break out that metal straightedge. Hold it firmly against the body, using clamps if necessary. I like to clamp a 2x4 to my bench as a "buck," then I clamp the body to it with spring clamps. Next, I simply make a pass with the X-Acto knife, gently "steering" the blade so that it presses slightly against the straightedge; you don't want it to wander off into a door or quarter panel.

Once you've scored the body, remove the straightedge, and peel away or snap off the waste; with straight cuts, you can usually fold the Lexan away from the cut line and snap it off cleanly.

■ **Curves.** Here's where those curved scissors come in handy; just be sure to hold them so that the blades curve in the same direction as the cut line. It's usually best to hold the scissors in one spot and feed the body into them rather than hold the body and contort your wrist as you move along the curve. On tight curves and the upper edges of some fender wells, you may find that the tips of the scissors gouge the paint. To avoid doing this, use the score-and-peel technique. Score the cut line with an X-Acto, using moderate pressure. You must use a fresh, sharp blade! Having been scored, the Lexan is easily peeled away along the cut line.



TOOLS OF THE TRADE

Without the proper tools, it is hard to get a good finished product, and each body might require particular tools to handle its unique features; I will give some tips on which tool should be used in a certain application.



■ **Straight scissors** (not shown)—the most common tool. Every household has at least one pair, but unfortunately, you can't use it to trim an entire body. They might be great for cutting hair and paper, but they're horrible for cutting curves. Use them only when cutting straight lines; this usually limits their use to trimming the span between wheel wells, but they're also good for cutting the "flats" on off-road wings' side dams.

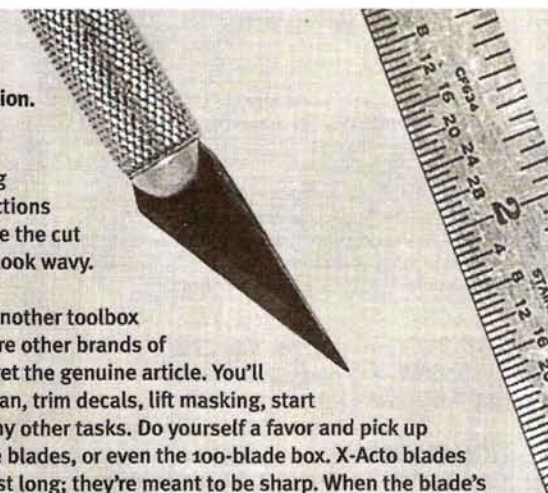
■ **Curved scissors**—often referred to as "Lexan" scissors. These are the R/C'er's best friend. Their short, curved blades cut curves and radiuses with ease, without scraping the body or leaving jagged edges. As long as their blades are sharp, they can be used to cut a fairly tight radius. Dull blades will tear the Lexan and won't give you that clean cut you're looking for. You can use these scissors to cut straight lines,



but avoid cutting long straight sections with them because the cut edge will tend to look wavy.

■ **X-Acto knife**—another toolbox necessity. There are other brands of hobby knife, but get the genuine article. You'll use it to score Lexan, trim decals, lift masking, start holes and for many other tasks. Do yourself a favor and pick up a pack of 15 spare blades, or even the 100-blade box. X-Acto blades aren't meant to last long; they're meant to be sharp. When the blade's superfine tip wears or snaps, replace it (dispose of it safely; I keep mine in a glass jar).

■ **Drill bits**—great for creating the perfect hole for your body mounts to slide into without too much slop. When the manual says "Drill a 5mm hole," you can actually do it! Start with a smaller bit to avoid tearing the Lexan, then use progressively larger bits to correctly size the body-post holes or transponder holes.



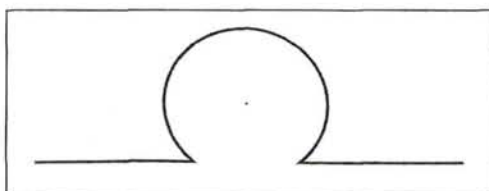
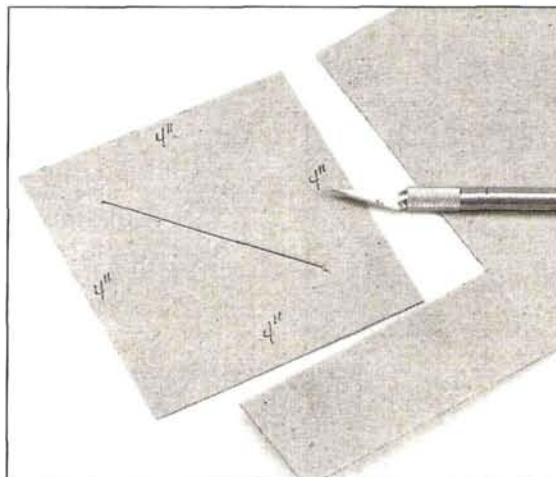


reamer will make a flange around the hole; trim this off with an X-Acto knife by gently dragging the blade around the hole.

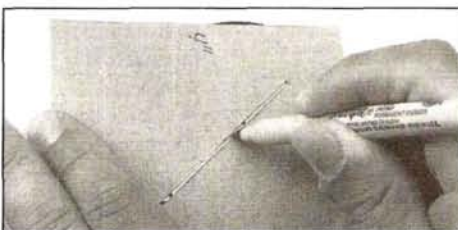
■ Holes.

The easiest and most precise way to start a hole is with an X-Acto knife. Its superfine tip won't wander, and it's easy to put it precisely at the center of where the hole will be. Spin the knife to start the hole, but stop once you have an opening of 1 millimeter or so; if you keep cutting, the hole won't be round.

Move on to a drill bit of the diameter you want the hole to be, or use a reamer to enlarge the hole; check the body-post fit frequently. The reamer should leave a clean edge. A dull



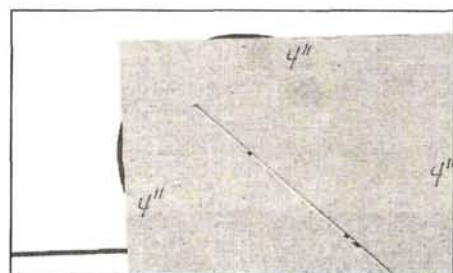
2. Place the template over the fender well (for clarity, I've drawn a fender well on paper) so that the straight edges are just touching the curved sides of the well (see photo). Use a permanent marker to draw a line on the body where the slot is.



How can I cut perfectly round wheel wells?

First, you have to find the center of the wheel well. If you have an HPI body, you're in luck: all HPI bodies have dimples molded in the Lexan to indicate where the center of the wheel opening should be. To find the center on other brands, you'll need to make a template from a piece of heavy paper. Here's what to do:

1. Cut a perfect, 4 x 4-inch square. Using a ruler, draw a diagonal line from corner to corner, then use an X-Acto knife to cut out a $\frac{1}{16}$ -inch slot along this line, right in the center.



3. Rotate the template 90 degrees and repeat step 2. The lines you make will cross precisely at the wheel well's center point!

■ **Reamer**—a multi-blade tapered tool that's excellent for cutting holes; it will enlarge a hole as you turn it.

■ **Dremel Moto-Tool.** Is there anything that this rotary tool can't do? Well, here's use 6,321. For tight curves, burrs, mounting holes and mistakes, a Dremel* can smooth out the worst trim jobs. With the proper cutting bit or sanding drum, there is no curve this tool can't round. A Dremel tool is perfect for rounding wheel wells and for dealing with those annoying burrs left by scissors. Like "X-Acto," "Dremel" is a brand name that's often used generically. There are other brands of rotary tools, but we suggest you go with a Dremel.

■ **Metal ruler (or "straightedge")**—a valuable tool? You might not have thought of it as such, but unless you have a built-in Inspector Gadget



straightedge that pops out from under your hat, you should add a high-quality metal ruler to your tool arsenal. Some bodies do not have a lower trim line, and a good, metal, straightedge makes the difference between having a sharp, straight rocker panel and one that looks as roted as your older brother's Nova, which he really will restore one day.

■ **Sanding block**—overlooked by many, but when finishing a body, a little sanding can really make the difference. Fine sandpaper folded around a wooden block or glued to the back of a ruler works great for smoothing straight edges, and piece of sandpaper wrapped around a dowel or a fat marker pen will help you get into curves easily.

Kyosho* offers a nice sanding tool packaged with its Lexan scissors.

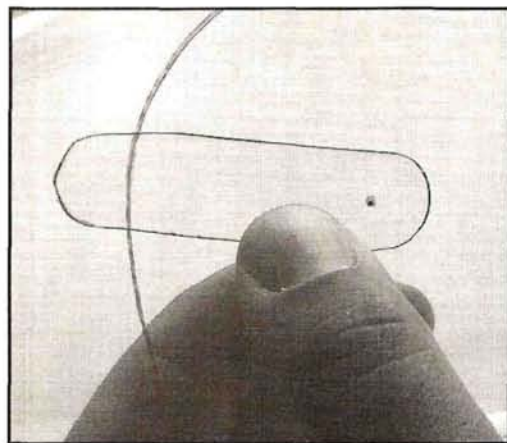


Now you need to make a “compass” from scrap Lexan; most bodies have plenty of scrap around the edge that is ideal for this type of work. Here’s what to do:

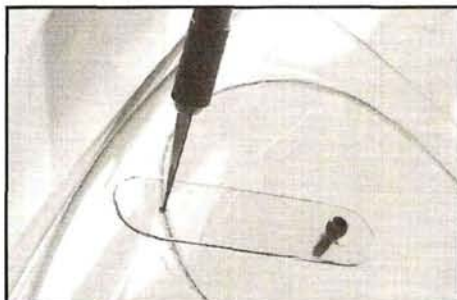
4. Trim off a piece of Lexan about 1/2 inch wide and 2 1/2 inches long.



6. Bore a small hole in the center of the wheel well (which you found with your template). This hole should be small enough to allow the screw to thread itself into the body. If you make it too large, just use a nut to hold the screw. Fasten the compass arm to the body with the screw, leaving it just loose enough to allow the arm to rotate.



5. Round the edges as shown, then bore a hole in one end for a screw; any small machine-thread screw will do. Make the hole just large enough to allow the screw to pass through without any play. If it’s a little tight, that’s OK.



7. Now make a tiny hole in the arm where it crosses the fender well trim line. The hole should be just big enough to let the blade’s fine tip pass through.

8. Now you swing the blade through the compass arm’s arc, scribing a perfect wheel well in the process. Make a few light passes to get a good score line, then peel out the waste; easy.

GETTING AROUND COMMON TRIMMING TROUBLES

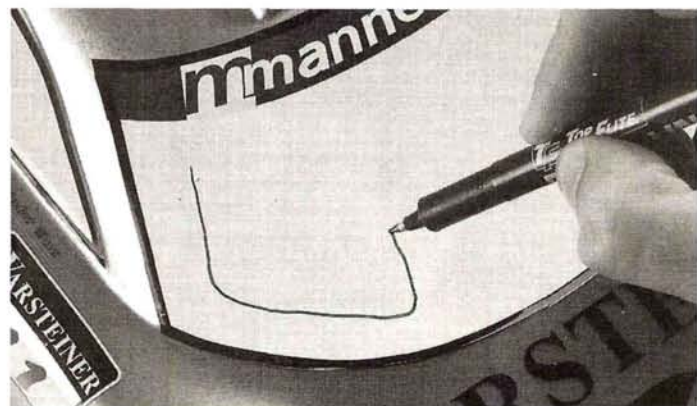
Every body (and everybody!) is unique, but there are common problems that just about any project will present. Here are the biggies and how to fix ‘em.

How do I cut that tiny curved portion out of an off-road body where the rear shock tower fits through it?

There are several ways: one is to drill a hole at the top of the opening with a drill bit that’s large enough to span the shock tower slot, then cut up to the hole with scissors. The other method is to cut out as much material as you can with scissors, then use the Dremel tool with a small-diameter cutting bit to buzz out the arch at the top.

How do I get rid of jagged edges?

If you nibble at a body with scissors instead of making smooth, full cuts, you might end up with a jagged edge. When trimming tight curves, however, this may be easier said than done, so here’s the fix: smooth jagged edges on “inside” curves such as fender wells with a sanding drum in the Dremel tool. Use only very light pressure, or you’ll be making divots. It’s easier to use a drum with larger diameter, and use a low speed setting. For smoothing straight cuts, use a sanding block or a Kyosho sander.



How do I cut out a widow or any other large opening to allow access to the fuel tank or to allow cooling?

With the right tools, it’s easy:

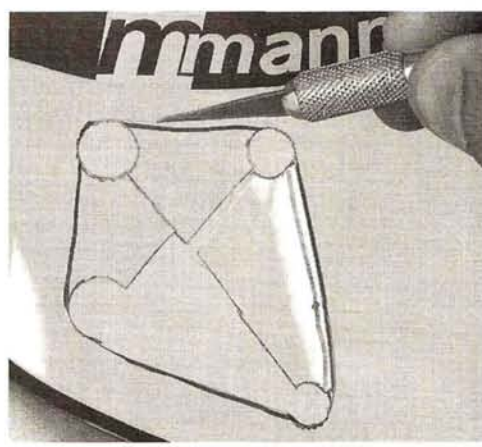
1. Draw the opening’s outline on the body with a marker.

2. Use a drill or a reamer to make holes at the corners of the outline. Start each hole well inside the line, then enlarge it until it reaches the line. Make sure that there aren’t any angular shapes; always have rounded corners. If two cut lines meet at an angle, they are virtually guaranteed to cause cracking or tearing.

3. Connect the “dots” (the holes) by scoring the Lexan with an X-Acto knife.

4. Next, connect the holes by scoring diagonally to form an “X.” Where the lines cross, use the reamer to make a large hole.

5. Now you can just peel away the Lexan to make your opening. Easy, isn’t it? If there are any little “blips” in the cut lines, smooth them with a Kyosho sander or a Dremel tool.



**The addresses of the companies mentioned in this article are listed alphabetically in the Index of Manufacturers on page 209.*

Need to know what's new? What works well and what doesn't? This section is devoted to objective reviews of all R/C car accessory items. From gears and wrenches to motor brushes and shock springs; if you can use it with your R/C vehicle, you'll find it critiqued on these pages.



168
Hudy
Tire Truer



170
DuraTrax
Shock-Shaft
Holder



170
Hobbico
Cutters

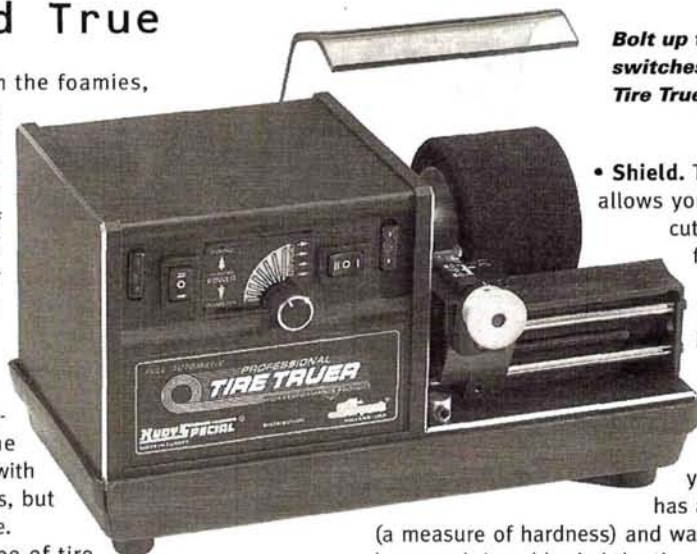
HUDY Tire Truer for 1/10 and 1/8 foam tires Tried and True

When you're rollin' with the foamies, excessive tire wear can be a problem. Uneven wear from the left to the right tire is the most common characteristic; this type of wear is typically caused by turning more often (or harder) in one direction than in another, and such wear can throw off your car's tweak, ride height and effective camber settings. What's the solution? Maybe a track with an equal number of turns, but I've never encountered one.

Coning is another type of tire wear in which one side of a tire wears faster than the other, which results in a tell-tale cone shape. Coning occurs when you run excessive camber or toe. So how do you combat such tire torture? Hudy's Tire Truer is a perfect solution to grind your tires back to a flat, fresh-out-of-the-package look and maximize handling.

Hudy's automatic tire truer is a compact unit that runs off a 12V power supply (purchased separately). On the control face, you will notice two switches, a control knob and, to the right of the control panel, a depth dial. Here's how the bells and whistles do their thing:

- **Power switch.** To the extreme left is the 3-position power switch; "off" is the center position. When flipped to the "up" position, the unit starts spinning the arbor (the arbor is the part that holds the wheel/tire; different arbors are available to fit different types of wheels). Flip it down, and it sets itself for automatic tire truing.
- **Speed control.** This knob is in the center of the panel; it controls the speed with which the cutting tool moves across the slide.
- **Cutting-tool switch.** Flipped to the left, this switch brings the cutting tool back to the left, or starting, position; flipped to the right, it brings the cutting tool to the right.
- **Depth dial and cutting bar.** The depth dial is used to set the depth of the cutting bar. Lines are provided on the bar so you can set the circumference between 60 and 80mm on the 1/8- to 1/10-scale tire cutter. The knob has increment lines that show you how much you have turned it.
- **Angle-adjusting screw.** By adjusting this tiny setscrew, you can change the angle of the slide to pre-cone tires (a technique used by 1/8-scale pilots). Up to 2 degrees of cone can be dialed in.
- **Dust container.** The base is actually a handy dust container that collects most of the tire grindings.



Bolt up the tire, flip the switches, and let Hudy's Tire Truer do all the work.

- **Shield.** The clear Plexiglas shield allows you to view the tire during cutting and protects you from flying debris.

OK; the Hudy Tire Truer has a bunch of features, but how does it work? I bolted up the optional sedan wheel arbor and a TRC double blue-compound tire; as many of you know, this type of tire has a high durometer reading

(a measure of hardness) and was an excellent test to see how much I could grind the tire without putting a massive strain on the unit's motor. I set the depth of the cutter to reduce the tire's diameter by about half, as I like to run my foam tires with low sidewalls. I turned the speed of the slide down and flipped the two switches to activate the automatic cutter. Keep in mind that Hudy does not recommend taking large passes and in fact suggests taking off 2mm or less at a time. Good advice, but I wanted to take it to the limit and see how much this tire muncher could chew at once. As the cutting bar slid across the tire, the motor slowed slightly but managed to finish off the cut. On the way back, it cleaned up the cut and shut itself off as the cutting bit returned to its starting point. Upon inspection, the tire was clean and even, just as if it had come off a factory truer. I spun the motor up one more time to round off the edges with sandpaper, and I had finished. One tip: remember that softer tires will expand from centrifugal force; you should take this into account when you set the cutting bar.

The Hudy Tire Truer is a precision tire grinder. After I had cut my first set of tires, I couldn't stop myself from cutting every foam tire I owned. Boy, did I make a mess! Although the truer has a dust-deflector shield and a dust-collecting base, it still throws a lot of rubber around when cutting tires. I recommend using the truer inside a cardboard box to catch the flying debris. I tested the automatic truer for 1/8 and 1/10 tires, but Hudy also offers a manual version of the same along with automatic and manual truers for 1/10 and 1/12 tires that can cut circumferences of between 40 and 70mm. Hudy also offers manual truers that feature the same precision components, but you'll have to manually slide the cutting bar across the tire.

LIKES

- Automatic cutting.
- Adjustable cut angle.
- Precision depth adjustment.

DISLIKES

- Even with dust guard and collector, the truer makes a mess (all truers do, though).

—Greg Vogel

DURATRAX

Shock-Shaft Holder

Gripping the ungrippable

I don't think anyone enjoys a good building session as much as I do, but I can't say that I ever look forward to threading shock eyelets onto shock shafts. I've tried all ways to make the task easier, but they all have their shortcomings. Padding the jaws of a pair of pliers with a rag protects the shaft but also diminishes grip. Grabbing the threaded portion of the shaft with the cutting jaws of pliers works great but doesn't allow the eyelet to be fully threaded onto the shaft. Then there's the classic I'll-just-use-pliers-right-on-the-shaft-and-be-careful technique. No matter how tightly you grip the shaft, there's always an inevitable, heartbreaking *skreeek* as you gouge the slipping shaft on the last turn.

DuraTrax* offers a solution to the grip-the-shock-shaft problem. While the Shock Shaft Holder looks unassuming and appears to be little more than a slotted brass subway token, it is surprisingly effective. The key to the tool is its material: while hard enough to hold the shaft tightly, the brass tool is "soft" enough not to scratch the shock shaft.

LIKES

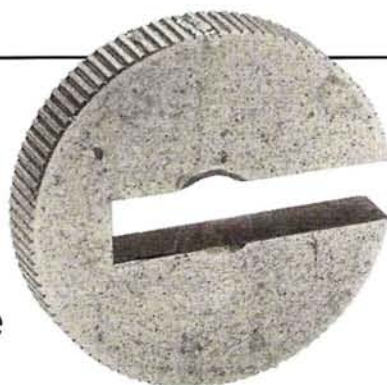
- It really works.

DISLIKES

- Nine bucks won't break anybody, but it's kind of pricey for a simple hunk o' brass.
- Requires a palm-busting squeeze to hold a shaft tightly.

To use the tool, put the shock shaft in the slot (which fits $\frac{1}{8}$ -inch shafts), and use a pair of pliers to put the squeeze on the tool.

I complemented the DuraTrax tool with a pair of Sears RoboGrip pliers and had no problems holding even liberally lubricated



Wokka-wokka-wokka ... The DuraTrax Pac Man is ready to chomp a shock shaft. Dimples in the jaws center the shaft.

shafts, but it does take a hearty grip to prevent the shaft from rotating. To test the tool's non-marring promise, I relaxed my grip just enough to let the shaft rotate. I couldn't detect any scratching or gouging; it works. Although the tool's \$8.95 asking price is steep, it will pay for itself once it spares you a few damaged shafts.

—Peter Vieira



It takes a manly squeeze to clamp the shock shaft effectively. A slip-joint style pliers like this Sears RoboGrip tool is the hot ticket.

HOBBICO

Cutters

Clean cut

Second to installing screws, the most common building task is snipping plastic parts from trees or otherwise removing extra bits of material before installing them. Twisting or snapping parts off is definitely not the hot setup and can lead to damaged parts.



Here's the underside of the cutting jaws; the blades are flush with the surface of the jaws, so no waste is left on the part.

Diagonal cutters are the logical choice, but these leave a "nub" that must be sliced off with an X-Acto blade. The best tool is a "flush cutter," such as this

LIKES

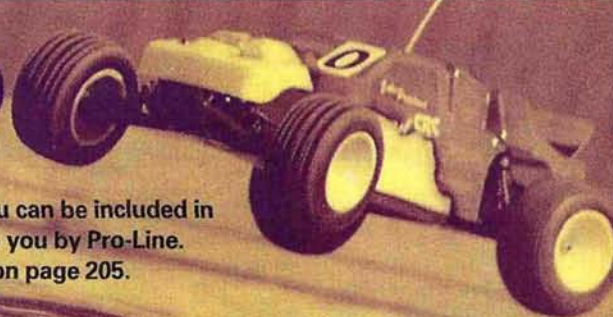
- Nice handles, strong jaws, high-quality construction.

DISLIKES

- None.

well-built Hobbico* tool. I've tried other flush cutters that worked well, but the Hobbico model is more heavily constructed and features beefier grips that don't seem likely to slip. The steel is thicker as well, allowing for less flexible blades. I had no trouble powering through the unusually thick sprue of Associated suspension arms, and even the unusually tough graphite material yielded to the Hobbico blades (but be warned: no matter what you cut 'em with, hard molded parts tend to fly when snipped. Watch those eyeballs!). The cutters are also handy for snipping items like silicone wires and antenna tubes and even for freshening knobbies. They're a worthy addition to any pit box.

—Peter Vieira



Track Directory

FREE! Track owners! You can be included in this directory brought to you by Pro-Line. Just fill out the coupon on page 205.

YOUR 1999 TRACK GUIDE

Key to Symbols

- Indoor
- Outdoor
- Off-road
- Oval
- Dirt oval
- Carpet
- Concrete
- Asphalt
- On-site hobby shop
- AC power
- Auto lap-counting
- Food available

ALABAMA

Beacon Point RC Raceway, 15717 Beacon Point Dr., Tuscaloosa, AL 35406; Don, (205) 333-8679

Hobbytown USA Raceway, 450-O Schillinger Rd. N., Mobile, AL 36608; Rob & Kari Baker, (334) 633-8446

Lagoon Park R/C Raceway, 2730 Lagoon Park Dr., Montgomery, AL 36109; Alex Love, (334) 272-6438

Phenix Raceway & Hobby, 2006 Opelika Rd., Phenix City, AL 36867; Chris Watson, (334) 298-9786; <http://www.xoom.com/PhenixHobby>

R/C Hi-Tech Raceway, 3303 Meridian St., Huntsville, AL 35811; Rick Chambers, (205) 539-1347.

R/C Thunder Tracks, 1530 Schillinger Rd., Mobile, AL 36675; for mail, use 8125-2 Moffett Rd., Semmes, AL 36575; Jerry Hurst, (334) 645-2787

ALASKA

Fairbanks R/C Car Club, 510 Juneau Ave., Fairbanks, AK 99701; Dan Anderson, (907) 456-5494

ARIZONA

HobbyTown Mountain Raceway, 1500 E. Cedar Ave., Cedar Hills Shopping Center, Flagstaff, AZ 86004; Richard, (520) 214-9887

HobbyTown Raceway, 13802 N. Scottsdale Rd., Scottsdale, AZ 85250; (602) 948-3946

HobbyTown Raceway, 1915 East Baseline Rd., Gilbert, AZ 95234; Dennis, (602) 892-0405

Hobbytown Raceway, 1102 E. 22nd St., Tucson, AZ 85704; (520) 882-8888

HobbyTown U.S.A., 5030 E. Ray Rd., Phoenix, AZ 85044; Linda McFarland, (602) 598-5282

Kiwanis Park R/C Raceway, 855 S. Magnolia Ave., Yuma, AZ 85364; Jim Liggett, (520) 539-7148

Quarter Flash's Squirrin' Dirt Raceway, 16301 S. Santa Rita #C, Sahuarita, AZ 85629; Dave, (520) 625-9274

R/C Sports Mania, 3550 N. 35th Ave., Phoenix, AZ 85017; Brian Dick, (602) 278-3671

Scottsdale R/C Raceway, 3023 N. Scottsdale, Scottsdale, AZ 85251; Scott Anfinson, (602) 945-2186

Speedway Hobbies, 2710 N. Steve's Blvd., Ste. 8, Flagstaff, AZ 86004; Gary McAllister, (520) 714-1566

ARKANSAS

Alison Offroad RC Raceway, 6320 Thibault Rd., Little Rock, AR 72206; Steve or Coop, (501) 490-1227

Arkansas R/C Car Association, 101 W. 52nd St., N. Little Rock, AR 72118; William Byrd, (501) 753-1286

Airport Speedway, 1521 Airport Loop, Rogers, AR 72756; Mike Dollar, (501) 636-7123

Grand Slam Superspeedway, 5300 S. Zero St., Ft. Smith, AR 72901; Bryon Shumate, (501) 648-1994

Hobby Town USA, 356 E. Joyce, Fayetteville, AR 72703; Darrell Irvin, (501) 571-3730

Sparks R.C. Raceway, 7194 Greene 721 Rd., Paragould, AR 72450; Tommy Sparks, (501) 239-3606

CALIFORNIA

Castle Hobbies, 14918 Camden Ave., San Jose, CA 95124; (408) 377-3771

Desert Hobbies, 28-401 Date Palm Dr. Cathedral City, CA 92234; Mike Beall, (760) 320-9442

Gooch Raceway & Hobbies, 115C N. Chevy Chase Dr., Glendale, CA 91206; Devin Last, (818) 562-2380, fax (818) 242-0525

Hobby Central Raceway, 34255 P.C.H., Unit 107, Dana Point, CA 92629; John, (619) 513-0373

Hobby Central II Raceway, 13461 Community Rd., Poway, CA 92064; John, (619) 513-0373

HobbyTown, Parktown Plaza Shopping Center, 1350 S. Park Victoria Dr. #21, Milpitas, CA 95035; (408) 945-6524

Hot Rod Hobbies, 25845 San Fernando Rd., #21, Saugus, CA 91350; Rod Weisbaum, (805) 255-2404

Jake's Performance Hobbies, 6650 Commerce Blvd. #21, Rohnert Park, CA 94928; Jake, (707) 586-3375

Just for Fun R/C Raceway, 509 S. State St., Ukiah, CA 95482; Don, (707) 462-7305

Lucerne Valley Raceway, 32800 Old Woman Springs Rd. #4, P.O. Box 2047, Lucerne Valley, CA 92356; Frank Rodrique, (760) 248-7305

M n M Hobbies, 4225 Prado Rd., Ste. 103, Corona, CA 91720; Joe Stanovich, (909) 272-3545

Nor-Cal Mini-Speedway, 519 Bush St., Woodland, CA 95695; Steve Van Atta, (530) 668-5678

Racer's Haven Raceway, 7401 White Ln. #12, Bakersfield, CA 93309; Martin Buchanan, (805) 835-0441

Radio Control Products, 201 E. Magnolia Blvd. #148, Burbank, CA 91502; Tab, (815) 846-4208

Rams 1/8-scale Gas and 1/16-scale Gas On-Road, Mission College, Lot B, 3000 Mission College Blvd., Santa Clara, CA 95054-1897; Steve Tsuruda, (415) 675-5609

Rattlesnake Raceway, 16470 Benson Rd., Cottonwood, CA 96022; Mel or Mike Fisher, (530) 347-7215, email: RC-geezer@webtv.net; website: <http://members.xoom.com/CAR-RCORR/Race.html>

Rescue Mini Speedway, 4018 Green Valley Rd., Rescue, CA 95672; Bruce Pease, (530) 621-3948

Ripon R/C Speedway, 701 N. Acacia Ave., Ripon, CA 95366; Dan Tanis, (209) 599-5160

Sacramento RC Racing and Hobbies, 6201 27th St., Sacramento, CA 95824; Andreas Muller, (916) 454-4044

Showtime R/C Speedway, 3709 Abbott Dr., Bakersfield, CA 93312; Grant or Karen Kniffen, (805) 589-0493

Simi Valley Groundpounders, 392 C - East Easy St., Simi Valley, CA 93065; Jack Kasten, (805) 584-8211

So. Cal R/C Raceway, 19118 Brookhurst St., Huntington Beach, CA 92646; Jim Blauvelt, (714) 963-7484

Tri-Valley Auto Racers, Livermore Elks Club, 940 Larkspur, Livermore, CA 94550; Mike Stone, (510) 455-6833

Ultimate Hobbies, 2378 North Orange Mall, Orange, CA 92665; Cliff Murukami, (714) 921-0424

COLORADO

Race of Champions R/C Speedway, 300 West 53rd Pl., Unit B, Denver, CO 80216; Dan DeWild, (303) 296-4908

S&T R/C Raceway, 323 Auburn Dr., Colorado Springs, CO 80909; Tim Bishop, (719) 574-2910

CONNECTICUT

Central CT Auto Racers, Davis Hobbies II, 454 Welles St., Glastonbury, CT 06033; (860) 633-3056

East Lyme R/C Kar Klub, Society Rd., East Lyme, CT 06333; Howard Estorm, (203) 483-9201

K/N R/C Speedway Inc., West St., Stafford Springs, CT 06076; for mail, 44 Clearview Rd., Moodus, CT 06469; (860) 684-9896

Racing and Entertainment Center, 29 Olcott St., Manchester, CT 06040; Peter Tierinni, (860) 643-4768

R/C Madness, 640 Enfield St., P.O. Box 64, Enfield, CT 06082; Christopher Marcy, (860) 741-6501

Xtreme Radio Control, 469 Danbury Rd., New Milford, CT 06776; Paul or Pete, (860) 354-4703

DELAWARE

The Hobby Outlet: Tracks of the Outlet, Salisbury Rd., Dover, DE 19901; Steve, (302) 697-8350

Hobby Stop Speedway, RD4, Box 100, Rte. 13, Seaford, DE 19973; Remy Haynes Jr., (302) 629-3944

FLORIDA

Broward County R/C Race Club, Mills Pond Park, Ft. Lauderdale, FL; Ed Decembere, (954) 525-3304

Burton's R/C Raceway, 4215 Mustang Rd., Lakeland, FL 33803; Louie Burton, (941) 665-1322

Coral Springs Roadrunners, P.O. Box 9632, Coral Springs, FL 33075; John Argentino, (954) 925-8284

Farmer's Hobby Shop & Raceway, 5006-3 E. Broadway, Tampa, FL 33619; Greg Cardone, (813) 248-3314

First Coast Speedway, 6410 Walther Dr., Jacksonville, FL 32211; Bob Thompson, (904) 743-2161

Frontier Race Track, 15260 N.E. 244th Ave., Salt Springs, FL 32134; Harold Reel, (352) 685-2881

G & C Hobby Raceway, 1228 Hypoluxo Rd., Lantana, FL 33462; George, (561) 547-3812

Greater Orlando Auto Racers, 970 Keller Rd., Altamonte Springs, FL 32714; Rob Michael, (407) 834-9299

Hobby World Raceway, 7273 103rd St., Jacksonville, FL 32210; Greg, (904) 772-9022

Kissimmee R/C Auto Racing, Model Craft World, Osceola Square Mall, 3831 West Vine St., Ste. 60, Kissimmee, FL 34741; John Rosser, (407) 944-4913; email: john@craftworldflorida.com; website: craftworld-florida.com

Paul's Stadium Raceway, 4511 W. Dr. M.L. King Jr. Blvd., Tampa, FL 33614; Paul Surette, (813) 872-8662

PBG R/C Motor Park, 6351 Barbara St., Palm Beach Gardens, FL 33418; Doug Gleason, (561) 743-9791 or Tim Case, (561) 627-2608

Pro Hobbies Speedway, 715 N. Lake Pleasant Rd., Apopka, FL 32712; (407) 886-4615

Means R/C Raceway, 150 Pondell Rd., North Fort Myers, FL 33903; Pete Gonzalez, (941) 772-2251; email: jaimewootton@worldatt.net, website: <http://members.xoom.com/wootj>

Monster Hobbies, 616 Southeast 10th St., Deerfield Beach, FL 23441; (954) 428-9118

Morris Kohl's Raceway and Hobby Shop, 1202 W. Waters Ave., Tampa, FL 33604; Morris Kohl, (813) 931-1626

My Rose, 1695 W. Indiantown Rd., Jupiter, FL 33458; Mark Watson, (561) 744-3800

NORRA, 3300 Santa Barbara Blvd., Naples, FL 34104; Dan Rodriguez, (941) 352-9021

Ocala Radio Controlled Car Club, P.O. Box 70166, 2610 SE 8th St., Ocala, FL 34470; Bonita Hansley, (800) 324-8882, ext. 250; email: staff@ORCCC.org, website: www.ORCCC.org

Paradise Speedway, Mile Marker 98.5 U.S. 1, P.O. Box 738, Key Largo, FL 33037; Joe Ravard, (305) 451-3707

Paul's Stadium Raceway, 4511 W. Dr. M.L. King Jr. Blvd., Tampa, FL 33614; Paul Surette, (813) 872-8662

PBG R/C Motor Park, 6351 Barbara St., Palm Beach Gardens, FL 33418; Doug Gleason, (561) 743-9791 or Tim Case, (561) 627-2608

Pro Hobbies Speedway, 715 N. Lake Pleasant Rd., Apopka, FL 32712; (407) 886-4615

Port St. Lucie Racing, 3626 SW Rivera St., Port St. Lucie, FL 34953; Frank Spadavecchia, (561) 336-8711



Randy's RC Raceway, 7744 Glenwood St., Clermont, FL 34711; Randy Zimmer, (352) 242-0557



River City R/C Car Club, 9711 Sharing Cross Dr., Jacksonville, FL 32257; Bill Fraden, (904) 268-1948



Sarasota RC Speedway, 8475 Cooper Creek Blvd., University Park, FL 34201; Jim Wilson, (941) 358-7047



Sea Coast Watercraft and Hobby, 3119 Barrancas Ave., Pensacola, FL 32507; Vic Lakatos, (850) 457-1493



South Daytona R/C Raceway, 2121 S. Ridgewood Ave., South Daytona, FL 32119; Mike Bean, (904) 426-6481



South Palm Beach Racers, South County Regional Park, West Boca Raton, FL 33486; Mike Fazio, (561) 338-5367



Superior Hobbies R/C Parking Lot Racing, 430 E. Hwy. 436, Ste. #106, Casselberry, FL 32707; Rob Michael, (407) 834-9299



Tampa Bay R/C Club, P.O. Box 10224, St. Petersburg, FL 33733; Dick Gillette, (813) 526-0744



Tampa Hobbytown R/C 4 Slot Car Raceway, 15702 N. Dale Mabry, Tampa, FL 33618; Max and Judy Rosenroth, (813) 968-7233



Tropical R/C Raceway, Tropical Park, Miami, FL 33155; Pat Butler, (305) 772-4122



Warehouse Hobbies, U.S. Rt. 27 South, Winterset Motel, Sebring, FL 33872; Tony and Pam Castronova, (941) 699-1231



GEORGIA

Anthony's Victory Lane, 129 East Hwy. 80, Pooler, GA 31322; Anna Stephens, (912) 748-0847



Dalton Raceway, 3036 Parquet Rd., Dalton, GA 30720; (706) 226-6699



Echeconnee Superspeedway, 2149 Richardson Dr., Macon, GA 31206; Andy Thompson or Cliff Kline, (912) 788-8731



Emerald City R.C. Speedway, Highway 40 East, East Dublin, GA 31021; Terry Cook, (912) 272-3856



The Flight Box Hobby Shop, 3134-C Rockmart Rd., S.E., Rome, GA 30161-6826; Leslie Duke, (706)-234-3014



Hobby Town Raceway, 2301 Airport Thruway, Columbus, GA 31904; Frank Bastos, (706) 660-1793



Lake Mayer Raceway, 1430 Dale Dr., Savannah, GA 31406; (912) 598-9709



The Racer's Edge, 1530 Hwy. 19 N., Thomaston, GA 30286; Roger or Mark Walls



Sandy Cross Speedway, Rt. 1, Box 1071, Hwy. 51, Royston, GA 30662; Morris Phillips or Wayne Fowler, (706) 245-9573



Shiloh R/C Raceway, 6362 Shiloh Rd., Hahira, GA 31632; Doug Burnett, (912) 794-2507



Silver Wings Raceway, 5611 Riverdale Rd., College Park, GA 30349; M. Bradshaw, (770) 991-2225



Stinger RC Super Speedway, 3769 Maysville, Rd., Commerce, GA 30529; Deric Sauls, (706) 335-5006 or (706) 335-9044



Sugar Bowl R/C Speedway, 5272 Nelson Brogdon Blvd., Sugar Hill, GA 30518; Shelley Bailey, (770) 945-6709



HAWAII

Garden Isle R/C Racers, 5855 Ahakea St., Kapaa Kauai, HI 96746; Arnold Morales, (808) 823-0856



Kakaako Water Front Park Dragway, 98-029 Hekaha St., Bay #32, Alea, HI 96701; James Inkyo, (808) 487-5155



Maui R/C Racing Association, 230 Hana Hwy., Unit 11, Kahului, HI 96732; Garret or John, (808) 873-0376, (808) 893-0116, or (888) 646-6687



Pearl City Raceway, 98-029 Hekaha St., Bay 32, Alea, HI 96701; James Inkyo, (808) 487-5155



Radio Control Hawaii, 474 Kalanikoa St., S-104, Hilo, HI 96720; Glenn Shiroma, (808) 935-5629



Team PRC Racing Club, 176 Mamo St., Hilo, HI 96720; Charlie Kawamoto, (808) 935-3561



IDAHO

Almosta Ranch Speedway, 1732 Eldridge Ave., Twin Falls, ID 83301; Casey Clements, (208) 733-8219



Capital Dirt Burners, 301 N. Bruce, Boise, ID 83712; Mike Ard, (208) 345-3906



Dirt Stuff Plus, 5344 N. Yellowstone Hwy., Idaho Falls, ID 83401; Brian Krah, (208) 522-7576



ILLINOIS

Adams R/C Raceway, 7201 S. Adams, Bartonville, IL 61607; Ray Tigue, (309) 633-9300



AJ's Raceway & Hobby, 10211 Keslinger Rd., DeKalb, IL 60115; A.J. Schultz, (815) 756-2772



C.I.R.C.A., 905 Bibbs St., Jacksonville, IL 62650; Sport 'n' Hobby, (217) 245-1375



C&R Hobbies, 39 E. Jones, Milford, IL 60953; Ray Craighead, (815) 889-4073



Depot Hobby Raceway, 180 S. Seminary St., Galesburg, IL 61401; (309) 342-9323



H & H Hobbies and Raceway, 9346 Virginia Rd., Lake in the Hills, IL 60102; Mike Hollingsworth, (847) 458-1777



Hans' RC Race Place, 2051 2100th St., Atlanta, IL 61723; Hans Bishop, (217) 648-2915



HobbyTown Raceway, 2103 N. Veterans Pkwy., Bloomington, IL 61701; Gary Pritts, (309) 664-4451



Leisure Hours R/C Raceway, 24121 W. Theodore, Bldg. 1, Plainfield, IL 60544; Scott Hill, (815) 439-1777 (track), (815) 439-1477 (shop)



Machesney Park, 1220 Shappert Dr., Machesney Park, IL 61115; (815) 282-1311



Marty's R/C Hobby, 1335 E. Broadway, Bradley, IL 60915; Gail or Marty, (815) 933-8441



Monroe R/C Raceway, 26049 Ridgeland Ave., Monroe, IL 60449; Roy or Roberta Moody, (708) 534-2422 (track), (708) 799-5597 (office)



Outlaw R/C Speedway, 1614 Broadway, Mattson, IL 61938; (217) 234-6229



Pontoon Raceway, 3670 St. Rte. 111, Granite City, IL 62040-4304; Pat or Skip, (618) 931-1206



Quad Cities Radio Raceway, 541 1st Ave. North, Silvis, IL 61282; Tom Bedwell, (309) 751-9663



Radio-Active Raceway, 751 N. Bollingbrook Dr., #15, Bollingbrook, IL 60440; Jim, (630) 759-7557



Rector's R/C Raceway, RR 3, Box 104, Albion, IL 62806; Tim Wolfe, (618) 446-3282 (Sun.)



Shiloh Eagles Superspeedway, 308 N. Virginia Ave., Belleville, IL 62220; (618) 277-6030



SIRCAR Raceway, 1200 N. Marion, Carbondale, IL 62901; (618) 549-5885



Stanton Hobby Shop, 4718 N. Milwaukee, Chicago, IL 60630; Kevin Kane, (773) 283-6446



Valley Farms R/C Raceway, 706 Bypass 20, Cherry Valley, IL 61016; Dean or Debbie, (815) 332-4516 or (815) 547-5984



Wep Speedway, RR #2, Box 44, Lawrenceville, IL 62439; Bill Poe



INDIANA

Bremen Racing Ent., 308 N. Bowen, Bremen, IN 46606; Dale Heuberger, (219) 546-3807



The Dirt Yard, 1117 W. Epier Ave., Indianapolis, IN 46217; Keith Dudas, (317) 786-6417



GM Raceway, 1651 W. Franklin St., Elkhart, IN 46516; Pete Russell, (219) 293-1827



Hardesty R/C Raceway, 11 East Plymouth St., Hamlet, IN 4653; Max Hardesty, (219) 867-8600



Hobby Barn Raceway, 1950 Springhill, Terre Haute, IN 47802-9694; (812) 299-5773



Hobbytown U.S.A., 5385 E. 82nd St., Indianapolis, IN 46250; Bill Scott, (317) 845-4106



Nitro R/C Speedway, 4310 West 400 South, Danville, IN 46122; John Webber, (317) 539-4413; email: nitro1rct@aol.com



P&T Hobbies and Raceway, RR 2 (Hwy. 60), Mitchell, IN 47446; Paul Weber or Tom Logsdon, (812) 849-6666; email: pntohobby@bigfoot.com



Race Street Hobbies, 1126 1/2 Race St., New Castle, IN 47362; Jim Burke, (765) 521-4888



RC Barn, 310 N 125 W, Monroe, IN 46772; Mark Lengerich, (219) 692-6600



R.C.R.C. Raceway of Salina, 1300 E. Crawford, Bill Burke Park, Salina, KS 67401; Calvin Calp, (913) 823-9588



R/C World of Indiana, 2246 West U.S. Hwy. 36, Lynn, IN 47355; Joe Kolp, (765) 874-2464; e-mail: rcworld@globalsite.net; web:www.RCWORLD.com



R/C Mania, 8 Wood Ct., Hebron, IN 46341; Ron Traubach, (219) 996-6288 (shop); (219) 762-5365



The Rink, 7900 Whitcomb, Merrillville, IN 46410; Don Reiner, (219) 769-8113



Showtime Lot Racing, 606 Lower Huntington Rd., Fort Wayne, IN 46815; Mike Romines, (219) 478-6099



Summit Area Radio Cars (SARC), 7000 Red Haw Dr., Fort Wayne, IN 46805; John Kissel, (219) 492-2271



IOWA

Delb's Speedway, 423 11th Ave. So., Clinton, IA 52732; Rusti's Miniatures and Hobbies, (319) 243-2697



Dubuque R/C Speedway, Dubuque County Fairgrounds, Dubuque, IA 52001; Paul Conlon, (319) 556-2736



Hobby Haven, 7672 Hickman Rd., Des Moines, IA 50322; Rick Marble, (515) 276-8785



Inside Challenge, 2028 Main St., Keokuk, IA 52632; Jessie, (319) 524-2225



Iowa City R/C Racing Association, Johnson County Fairgrounds, Bldg 6, 3149 Old Highway 218 South, Iowa City, IA 52246; Hobby Corner, (319) 338-1788; fax (319) 356-6509; track is fully covered by roof



IROAR-Hawkeye Downs Raceway, Hawkeye Downs, 6th St. S.W., Cedar Rapids, IA 52404; Dave Kleinschrodt, (319) 556-8524



Manly R/C Club, Box 23 (Hwy. 65), Manly, IA 50456; Bruce Hill, (515) 454-2025



Marble's Raceway, 4685 SE 40 St., Des Moines, IA 50317; Rick Marble, (515) 262-7507



Mr. Car Raceway, P.O. Box 1112, Central Iowa Fairgrounds, Marshalltown, IA 50158; Jim Gossett, (515) 483-2234



Outback Speedway, 403 State St., Guthrie Center, IA 50115; Helens Enterprises, (515) 747-3064



Radio Control Raceway Park, 2100 First Ave. N., Fort Dodge, IA 50501; Bernie Halverson, (515) 576-3780



Riverside Raceway, Veteran's Park, Algona, IA 50511; Mike Beisch, (515) 295-9352



Shentona Speedway, 1215 W. Lowell, Shenandoah, IA 51601; Doug Cross, (712) 246-5984



Wild Bill's Raceway, 901 W. Jones, Knoxville, IA 50138; William Anderson Jr., (515) 842-5973



KANSAS

Hobbytown USA, 2016 W. 23rd, Lawrence, KS 66046; Kevin Decembarus, (913) 865-0883



Mike's R/C Hobbies, 121 SE 29th St., Unit #3, Topeka, KS 66605; Mike Barnard, (913) 266-5767



Ottawa Outlaw Raceway, 114 South Main, Ottawa, KS 66067; Tom Wilson, (913) 242-1450



R/C Superdome and T.O. Pro Shop, 14 E. Avenue A, Hutchinson, KS 67501; Cody or Joe, (316) 665-6633



R/C World Raceway, 217 Brownie Ave., Scranton, KS 66537; John and Kyle, (913) 793-2313



RCRC Raceway, 507 N. 4th, Atwood, KS 67730; Bob Dunker, (913) 626-3261



T.O. Pro Shop, 14 E. Ave. A, Hutchinson, KS 67501; Cody Jandrakovic, (316) 665-6633



KENTUCKY

Bourbon City Raceway, 213 West Stephen Foster Ave., Bardonia, KY 40004; Ryan Barnes, (502) 349-0066



Dixon's R/C RaceWay, 1428

C&C Hobby & Raceway, 562 Russells Mills Rd., So. Dartmouth, MA 02748; Charlie, (508) 997-4131



Hi-Tech Hobbies, 1681 Broadway (Rt. 138), Raynham, MA 02767; Ruben, (508) 880-5373



Megadrome Raceway, Rt. 8, Curran Hwy, North Adams, MA 01247; Bob Blanchette, (413) 743-7223



Northboro Speedway, 168 Main St., Rte. 20, Northboro, MA 01532; Bob Trimble, (508) 393-8087



MICHIGAN

D.R. R/C, 22789 Northline Rd., Taylor, MI 48180; Bobby or Fred, (734) 287-7405



Freedom Hill R/C Raceway, 35372 Wellston, Sterling Heights, MI 48312; Curley Grew, (810) 776-5483



Great Lakes R/C Racer's Club, 1035 E. State St., Hastings, MI 49058; John Warner, (616) 948-9798; email: grtkscrcw@aol.com, www.members@aol.com/grtkscrcw/index.html



Hobby Hub, 5859 M99, Diamondale, MI 48821; Verne Goebel, (517) 337-9278 or (517) 351-5843



Jon's Hobby, 4739 E. Pickard, Mt. Pleasant, MI 48858; Jon Beutler, (517) 773-5412



JT Superspeedway, W. Golden Ave., Battle Creek, MI 49015; Jerry or Sam, (616) 965-0116



Larry's Performance R/Cs, 43665 Utica Rd., Sterling Heights, MI 48314; Larry, (810) 997-4840



Lazer RC Speedway, 2858 N. Wilmoth Hwy., Adrian, MI 49221; Russ Johnson, (517) 263-2806



Motor City Speedway, 1602523, mile Rd., Macomb Township, MI 48042; Gary Cornwell, (810) 677-2470



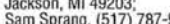
N.M.R.C.C. Raceway, Hobby Toy, Main St., Gaylord, MI 49735; Ed Schneider, (517) 732-3963



Ovaith's R/C Speedshop, 3920 N. U.S. 31 S., Traverse City, MI 49684; Jim Ovaith, (616) 947-6670



R.A.C.E. Inc., 3227 Mathews, Jackson, MI 49203; Sam Sprang, (517) 787-9161



Raw Roots Race Tracks, 14623 East Crosswell, 1/4 mile north on 152nd (off U.S. 31), West Olive, MI 49460; Roy Bennink, (616) 399-9338



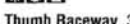
R&L Hobbies & Racing, 9782 Portage Rd., Kalamazoo, MI 49002; Rex Simpson, (616) 323-3686; fax (616) 329-1744



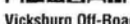
Rodgers R/C Raceway, 7463 Ridge Rd., Britton, MI 49229; George Rodgers, (517) 451-8301



Thumb Raceway, 3441 Main St., Marlette, MI 48453; Jim Wilson, (517) 635-7848



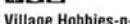
Vicksburg Off-Road R/C Raceway, 50201 Silver St., Vicksburg, MI 49097; Tim, (616) 323-7963



T.J.'s RC Raceway, Rt. 2, Box 22C, Luther, MI 49656; Tod Smart, (616) 797-8035



Village Hobbies-n-Crafts, 195 N. Elm, Hesperia, MI 49421; Alan or Fran, (616) 854-1374



Village R/C Raceway, Prairie Ronde St., Decatur, MI 49045; Chuck Nolke, (616) 423-7878



Washtenaw R/C Raceway, Ypsilanti, MI 48198; Jim Rousseau, (734) 395-5048



Willis Outdoor R/C Racetrack, 13922 Oakville-Waltz Rd., Willis, MI 48191; Mike Higgins, (734) 587-2012



MINNESOTA

Bemidji R/C, 1015 Miles Ave. S.E., Bemidji, MN 56601; Russ or Ryan, (218) 751-1629



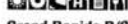
Car Town USA, 2822 Piedmont Ave., Duluth, MN 55811; Roger Deloach, (218) 727-6248



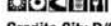
Duey's Hobbies & R/C Raceway, 6600 Cahill Ave., Inver Grove Heights, MN 55076; Duey Carlson, (612) 450-1721



FunCity, 9100 Park Ave., Elk River, MN 55330; (612) 441-8365



Grand Rapids R/C Speedway, 2209 Hwy. 2 East, Grand Rapids, MN 55744; Aaron Voges, (218) 326-6751



Granite City R/C Speedway, 3555 Shadowwood Dr. N.E., East Hwy. 23, Sauk Rapids, MN 56379; Brett Donahue, (320) 251-6980



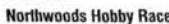
J's Radio Control Race Park, 22994 290th Ave., Starbuck, MN 56381; Jay Campbell, (320) 239-4827



Kevin's Private Off-Road Raceway, 702 So. Washington Ave., Crookston, MN 56716-2317; Kevin Altepeter, (218) 281-7523 or (218) 281-3863 (please call first); email: kevnles@crookston.polaristel.net



Northwoods Hobby Raceway, 2638 Hwy. 25 North, Brainerd, MN 56401; Tom Grogg, (218) 829-9257



Ray's Raceway Park, 105 3rd Ave. NE, Glenwood, MN 56334; Dan Winter, (320) 634-5246



R/C Racing World, 235 Main Ave. North, Harmony, MN 55939; Mark McKay, (507) 886-5931 or (507) 886-2224



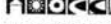
Red Barn RC Raceway, Rt. 4, Box 333, Mankato, MN 56001; Rusty Weiss, (507) 345-8972



Southside Speedway, 2241 Marion Rd. SE, Rochester, MN 55904; Kevin Guy, (507) 281-3233



Time R/C Raceway, 20 West Lake St., Chisholm, MN 55719; RV, (218) 254-4321



MISSISSIPPI

Joe McFadden Hobbies, 5531 Fox Meadow Dr., Meridian, MS 39307; Joe McFadden, (601) 483-7000



Small Cars Unlimited, 820 Cooper Rd., Jackson, MS 39212; (601) 372-FAST; www.smallcarsunlimited.com



MISSOURI

All Seasons Hobby, 29 O'Fallon Square, O'Fallon, MO 63366; Bob Daniels, (314) 281-8767



B&L Hobbies & Raceway, 2800 Anchor Dr., Park Hills, MO 63061; Bob Marler, (573) 431-9444



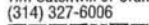
Fire Mountain Raceway, 8647 Commercial Blvd., Pevely, MO 63070; Dan Gordon, (314) 475-6449



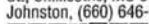
Greentree R/C Racepark, St. Louis Dirt Burners R/C Club, Marshall Rd., Kirkwood, MO; (314) 831-2194



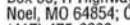
Hobbies 'N Stuff Raceway, 204 Mall Pkwy., Wentzville, MO 63385; Tim Satchwill or Crandall Olds, (314) 327-6006



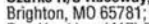
North Missouri Raceway, 223 Graves St., Chillicothe, MO 64601; Billy Johnston, (660) 646-1120



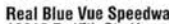
Ozark Mountain Speedway, Rt. #2, Box 50, H-Highway and County Rd. 31, MO 64854; Clayton Younker, (417) 475-6222



Ozarks R/C Raceway, Hwy 13N, Brighton, MO 65781; Gene Rhodes or Ron Hawkins, (417) 742-4376 or (417) 742-7223



Real Blue Vue Speedway, 12019 E. 47th St., Kansas City, MO 64133; Mark Randol, (816) 358-0238



Real R/C Raceway, 24204 State Rt. 58, Pleasant Hill, MO 64080; Steve Hale, (816) 540-5584



MONTANA

Stormer Raceway & Slot Motorplex, P.O. Box 126, Hwy. 2 East, Glasgow, MT 59230; (406) 228-4569



NEBRASKA

Goodyear Speedway and Off-Road, 4021 North 56th, Lincoln, NE 68510; Tom or Bob, (402) 464-5172



Hadar R/C Raceway, 55192 849th Rd., Norfolk, NE 68701; John Schoenauer, (402) 644-7922



Hobby Town USA Raceway, N. 1st St. & Cornhusker Hwy., Lincoln, NE 68508; Ben Smith, (402) 434-5056



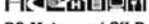
Mr. Bill's, 450 West 2nd St., Hastings, NE 68901; Bill J. Ries, (402) 462-4855



O.N.R.O.A.D., 3307 N. 58 St., Omaha, NE 68104; Cook Jacobs, (402) 556-8674



OTWG Carpet Raceway, 55129 849th Rd., Norfolk, NE 68701; John Schoenauer, (402) 644-7922



RC Motorsport Off-Road Raceway, 5600 Mass Rd., Papillion (Omaha), NE 68133; Marty Stepanek, (402) 593-6133



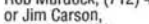
Salvation Army South Corps, 4032 Harrison St., Omaha, NE 68164; (402) 734-3414; fax (402) 734-3415



T & T Raceway, 476 26th Ave., Columbus, NE 68601; Tom, (402) 564-9216



The Speed Zone, 1524 Atokad Dr., South Sioux City, NE 68776; Rob Murdock, (712) 428-4679, or Jim Carson, (712) 274-7731

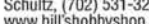


Wacha's R.C. Speedway, 1823 23rd St., Columbus, NE 68601; Tom Smith, (402) 564-9216

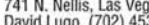


NEVADA

Bill's Hobby Shop, 1000 N. Nellis Blvd., Las Vegas, NV 89110; Bill Schultz, (702) 531-3282; website: www.billshobbyshop.com



Dansey's Indoor R/C & Hobbies, 741 N. Nellis, Las Vegas, NV; David Lugo, (702) 453-RACE, (888) 675-8963; www.danseys.com



Lizard Raceway, P.O. Box 1248, Verdi, NV 89439; Jeff Griffin, (702) 345-6573



NEW HAMPSHIRE

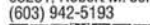
Axis Racing R/C Dragway, 4197 High St., Exeter, NH 03833; Dan Peterson, (603) 659-4877



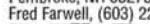
Economy R/C Speedway, 4 Maple St., Winchester, NH 03470; Harold Thomas, (603) 239-4482 or 239-6470



Robert's Railroad & Hobbies, 1335 1st NH Turnpike—Rt. 4, Northwood, NH 03261; Robert M. Jeffers Jr., (603) 942-5193

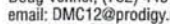


RT 106 Racepark, 743 Clough Mill Rd., Pembroke, NH 03275; Fred Farwell, (603) 224-RACE

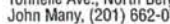


NEW JERSEY

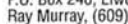
American Raceway, 142 Wilson Ave., Englishtown, NJ 07726; Doug Venner, (732) 446-3737; email: DMC12@prodigy.net



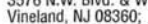
America's Hobby Center Inc., 8300 Tonelle Ave., North Bergen, NJ 07047; John Many, (201) 662-0777



Checkerboard Raceways, P.O. Box 240, Elwood, NJ 08217; Ray Murray, (609) 629-4809



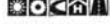
Family Hobbies Raceway, 3576 N.W. Blvd. & Weymouth Rd., Vineland, NJ 08360; Linda Vogel, (609) 696-5790



Jackson R/C Racing, P.O. Box 565, Christopher Columbus Blvd., Jackson, NJ 08527; Al Sodano, (732) 364-6422, or Ed, (732) 928-8963



Jefferson Speedway, 5494 Berkshire Valley Rd., Oak Ridge, NJ 07438; (201) 697-7525



Jerry's Hobby Center & Raceway, 336 Rt. 22W, Greenbrook, NJ 08512; Jerry or Gary, (908) 752-6030



LBRA Track, 392 Warburton Pl., Long Branch, NJ 07740; (908) 222-5122



Millville R/C Oval, 114 N. High St., Millville, NJ 08332; William Denstoz, (609) 327-4640



On Trax Hobbies, 3101 Rte. 70, Browns Mills, NJ 08015; Joseph DiGirolamo, (609) 735-0422



South Jersey Cost Controlled Racing, 25 Jackson Ln., Sicklerville, NJ 08061; Ray Murray, (609) 629-4809



The Race Place, 1151 Hwy. 33, Farmingdale, NJ 07731; John Fary, (908) 938-5215



NEW MEXICO

Charlie's Hobby Shop, 225 E. Idaho, Ste. 11, Las Cruces, NM 88005; Kim, (505) 541-1097

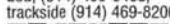


Las Cruces R/C Racer's Association, Meerscheidt Recreation Center, Walnut and Hadley by BMX, Las Cruces, NM 88001; D.J. Clark, (505) 546-4269; email: jade@zianet.com; www.zianet.com/jade/lcrca.htm;



NEW YORK

BarnStormers Speedway, 205 Gray Court Rd., Chester, NY 10918; Lou, (914) 469-6468; trackside (914) 469-8206



Brennan's R/C Hobbies, 6368 State Rt. 5, Vernon, NY; Bill or Tom Brennan, (315) 829-4930



Brownie's Pro & Sport Hobbies, 124 Bennett St., Staten Island, NY 10302-1426; John Brown, (718) 727-2194



Bruckner Racing, 2908 Bruckner Blvd., Bronx, NY 10465; Thomas Baffers Sr., (800) 288-8185



BSK Hobbies & Raceway, 120 Main St., Hometown, NY 14843; Bruce Harris, (607) 324-4011, (800) 603-0197



C&C Speedway, 570

Tri County Remote Control Car Club,
33 West Decker St., Johnstown, NY 12095;
Tom Leville, (518) 725-1279



TARMAC—Ultimate R/C Raceways,
28/30 Mountain View Rd., Poughkeepsie,
NY 12603;
Todd, (914) 342-5409;
Greg, (914) 528-5084;
trackside, (914) 454-8276;
www.tarmacraceway.com



Walt's Hobby, 2 Dwight Park Dr.,
Syracuse, NY 13209; (315) 453-2291



Westfield R.C. Speedway,
27 Clark St., Westfield, NY 14787;
John or Jared Lindstrom,
(716) 326-2339; 716-326-2309



Whitestone, 30-56 Whitestone Expy.
(Dept. of Motor Vehicles), Flushing, NY
11374; Rudolf Ardilla, (718) 966-6155



Willis Hobbies R/C Speedway, 300
Willis Ave., Mineola, NY 11501;
Ken Ford, (516) 746-3944



ZOAR Road Speedway, 15318 Armes
Ct., Gowanda, NY 14070; David &
Gordon Ackler, (716) 532-9463



NORTH CAROLINA

A&J R/C Models, 2051 Anthony Rd.,
Burlington, NC 27215; Jerry Loye or
Andrea Thompson, (336) 227-4556;
fax (910) 227-1001



The Antique Barn, 2810 Forest Hills Rd.,
Wilson, NC 27893; (252) 237-6778



Atlantic Coast R.C., 8-A Lockhead Ct.,
Greensboro, NC 27409; Charlie Higgins
or Harry Johnson, (336) 664-1277



Badin Shore Raceway, 1730 Jackson
Lake Rd., High Point, NC 27263; Jimmy
or Tim Martin, fax (910) 431-6407



C/C Hobby Speedway, 8358 U.S. Hwy.
220 Bus. N., Randleman, NC 27317;
Steve & Mary Cox, (910) 495-3482



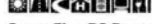
C/W R/C Speedway, 1297 Charlotte
Hwy., Asheville, NC 28730;
Billy or Tim, (828) 684-0061



Carolina Dragway, 1555 Turkey Hwy.,
Clinton, NC 28328; (910) 592-9489



Chatham R/C Raceway, 326 Reno
Sharpe Store Rd., Bear Creek, NC 27207;
Dwight Fields, (919) 898-2991



Green Flag RC Raceway,
107 Harley Rd., Wilmington, NC 28401;
Mike McLemore,
(910) 452-1620



R & D Speedway,
418 Main St., Tarboro, NC 27886;
John Dupree, (919) 823-2294



Ride & Slide R/C Raceway,
5319 Yadin Rd., Fayetteville, NC
28303; Bill Culbertson, (910) 867-4202



Radio Jockey's Parkway, "RJ's,"
Rt. 9, Box 651, Fay, NC 28301;
www.wave-net.net/mshutt;
Tony Starling, (910) 486-4820



R.C.R. Speedway, 1415 Henderson
Grove Church Rd., Salisbury, NC 28147;
Ronnie Linker, (704) 637-2565



Rosewood R/C Speedway, 651
Community Dr., Goldsboro, NC 27530;
Glenn Elam, (919) 731-4734



Southern RC Motorsports Club, Hwy.
17S., P.O. Box 1651, Shallotte, NC
28459; Mark Whitt, (910) 754-4902 or
Eddie Ferster, (910) 754-8528



Youngsville R/C Club, 6516 NC 96
Hwy. W., Youngsville, NC 27596; James
Ray, (919) 556-0446



NORTH DAKOTA

Northern Mini Racers,
1000 36th St. S.E., Minot, ND 58702;
Mike, (701) 838-5818



River City R/C, 2714 Main Ave.,
 Fargo, ND 58103;
Chris Hughes, (701) 235-1272



OHIO

AK Hobby and Raceway,
3826 North Bend, Cincinnati, OH 45211;
Tim Tolle, (513) 661-7080



American Ohio Sprint Car,
1708 Empire Rd., Wickliffe, OH 44092;
Gary Waldhelm, (440) 944-9966



Classic Hobbies, 1994 E. Waterloo Rd.,
Akron, OH 44312; Walt Ellis,
(330) 733-6400



CORCAR/Sams Club, 128 Amity Rd.,
Galloway, OH 43119-8732;
Bill Stevenson, (614) 870-7159



**Columbus R/C Racing Club
(C.R.C.R.C.),** Franklin County
Fairgrounds, Hilliard, OH 43026;
Jeff Crowell, (614) 236-1783



D&J R/C Raceway, 801 W. Market St.,
Orville, OH 44667; Don Yoder or Mark
Nussbaum, (330) 682-4266



Full Throttle Raceway, 600 Mt. Moriah
Dr., Cincinnati, OH 45255;
Bill Dolch, (888) 571-5174



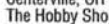
Glass City Radio Control,
2620 Ivy Pl., Toledo, OH 43613;
Frank Johnson, (419) 472-1286



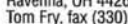
Greentown R/C Raceway, 3353
Perrydale, Greentown, OH 44630;
Chuck Lambert, (330) 364-6585



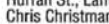
Hobby Shop Raceway, 2096
Miamisburg Centerville Rd.,
Centerville, OH 45459;
The Hobby Shop, (937) 436-6161



Hobby World, 3499 SR 59,
Ravenna, OH 44266;
Tom Fry, fax (330) 296-0894



Lafferty R/C Raceway, Box 153, 70228
Hurrah St., Lafferty, OH 43951;
Chris Christman, (740) 968-4818



Mid American Raceway, 13150 Airport
Hwy., Swanton, OH 43558;
Bill or Chuck, (419) 475-9459



Nothing But Air R.C. Track,
34632 True Rd., Logan, OH 43138;
Gary Lloyd, (740) 385-0288



Shiray's Hobby & RC Raceway, 19930
State Route 117, Waynesfield, OH
45896; Ray Zimmerman,
(419) 568-8055



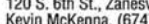
TARCAR, 7216 Nebraska Ave., Toledo,
OH 43617; Bill Bridges, (419) 826-3859



Van Wert R/C Raceway, 144 E. Main St.
(above Hoverman Music), Van Wert, OH
45891; Mark Davis, (419) 232-2112



Y-City Hobby & Speedway,
120 S. 6th St., Zanesville, OH 43701;
Kevin McKenna, (674) 455-3025



OKLAHOMA

Adams Creek R/C Speedway, 5207 S.
194th E. Ave., Broken Arrow, OK 74014;
John Beighle, (918) 355-1416



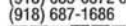
Competition R/C, 100 S.E. 89th,
Oklahoma City, OK 73149; James or
Louise Brown, (405) 634-0809



Enid R/C Speedway, 1821 S. Van Buren
(Hwy 81), Enid, OK 73701; Bob, (580)
233-3344 or (580) 234-7666



Wild Country Speedway, 127 S. Main,
Porter, OK 74454; Charles McCollough,
(918) 685-0372 or
(918) 687-1682

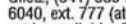


OREGON

Competition Racing Association,
17941 N.E. Gleason, Portland, OR
97230; Mark Taylor, (503) 761-1334



D.I.R.T. R.O.A.D. Club, 65540 73rd St.,
Bend, OR 97701; Daleyne and Edward
Gliezt, (541) 388-2932 or (800) 475-
6040, ext. 777 (at 2nd dial tone, enter
ext.); email: blue@coinet.com



R/C Craze Speedway,
300 Ashland Ln., Ashland, OR 97520;
Shawn Lazareff, (541) 482-4786



R/C Plus Hobbies Raceway,
1857 25th St. S.E., Salem, OR 97302;
Ron Smith, (503) 364-9188



R/C Speed Center, 2810 N. Pacific Hwy.,
Medford, OR 97501; Gene and Betty Jean
Skellton, (541) 779-8298



Rose City Scale Racing, 8700 S.E.
Revenue Rd., Boring, OR 97009;
Stew Keene, (503) 663-6509,
fax (503) 663-9021



Yamhill County R/C Car Club,
722 Morgan Ln., McMinnville, OR
97128; Larry Rucker, (503) 472-7234



PENNSYLVANIA

Courtview Raceway, 20 S. Main Street
(lower level), Washington, PA 15301;
Aaron Stimmell Jr., (724) 225-4302



DC Ultra Trax, 13 York Rd.,
Wycombe, PA 18974;
David Cowan, (215) 672-5200



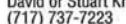
Dreamboat Hobbies,
2810 Pennsylvania Ave. W., Warren, PA
16365; Louie Dussia, (814) 723-8052



Koontz's Home & Hobby Center,
1205 Hoover St., Pittsburgh, PA
15204; (412) 331-3866



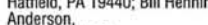
Kranzel's R/C Raceway & Hobbies,
415-B Bosler Ave., Lemoyne, PA 17043;
David or Stuart Kranzel,
(717) 737-7223



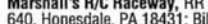
Little Plum R/C Hobbies,
RR 1, Box 330, Lock Haven, PA 17745;
Larry Duck, (570) 769-1984



Lugnut Raceway, 1713 Bethlehem Pike,
Hatfield, PA 19440; Bill Henning or Kathy
Anderson, (215) 822-5831



Marshall's R/C Raceway, RR 4, Box
640, Honesdale, PA 18431; Bill or Dot
Marshall, (570) 729-7458



McCullough's Offroad, 108 Callen Rd.,
Sarver, PA 16055; Doug McCullough,
(724) 352-0116; email:
DMcCull323@aol.com



The Mushroom Bowl, 960 W. Cypress
St., Kennett Square, PA 19348;
Bruce or Drew,
(610) 444-1850



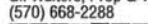
Pinion Twisters, 3M Plant, Green Ln.
and Mitchell, Bristol, PA 19007;
Mark, (215) 632-2344
or Tony, (215) 742-3560



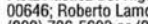
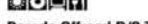
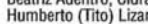
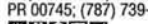
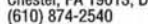
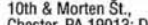
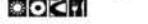
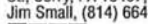
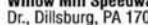
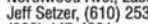
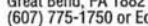
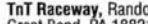
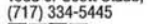
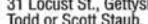
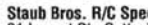
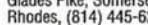
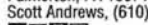
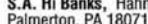
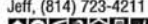
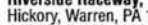
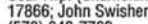
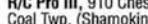
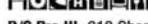
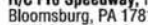
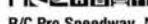
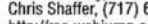
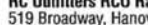
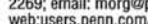
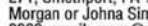
Pit Stop Hobbies, 262 W. Main St.,
Mount Joy, PA 17552;
James Stoudt Jr., (717) 653-6222



Prop & Wheels Raceway,
139 W. Broad St., Tamaqua, PA 18252;
Gil Walters, Prop & Wheels Hobbies,
(570) 668-2288



Racers Edge R/C Racing, RR#1, Box
271, Smethport, PA 16749; Rick
Morgan or Johna Simar, (814) 887-
2269; email: morg@penn.com;
web:users.penn.com/~morg/track.html



Futrell's R/C Hobby Shop, 1715 Jackson Ave., Seymour, TN 37865; Dan Futrell, (423) 908-9526



Hillside R/C Raceway, 4194 Oakhill Rd., Dayton, TN 37321; John and Rusty Tipton, (423) 775-4739



Hobby Town USA, 2000 Mallory Ln., Franklin, TN 37067; Bobby Mills, (615) 771-7441



Machine-Head Straits, 938 Grandmere Rd., Lawrenceburg, TN 38464; Larry and Eliane Sanders, (615) 762-6630



MID-South Racing Association, 9155 Hwy. 72 (Poplar Ave.), Germantown, TN 38138-7903; (901) 757-8774



MSA R/C Racing, Rt. 12, Box 489 B, Crossville, TN 38555; D.R. Findley, (931) 456-0027



R & R Racing Portable Track, RR3, Box 34, Linden, TN 37096; Ross or Ron, (931) 589-5433



TnT Raceway, 643 Loop Hollow Rd., New Tazewell, TN 37825; Cliff Swett, (423) 626-9065 or (423) 869-8942

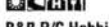


W.O.W. Raceway, 59 Luray Rd., Beech Bluff, TN 38313; Kelly Bean, (901) 427-7874; email: windix60@pipeline.com



TEXAS

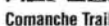
215 Speedway, 1814 County Rd. 215, Abilene, TX 79602; Clyde Gardner, (915) 673-2351



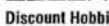
B&B R/C Hobbies, 700 East 4th, Big Spring, TX 79720; Walter Bumbulis, (915) 263-1790



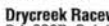
Big Mike's R/C Raceway, 1405 W. Cotton St. (behind the Locker Room), Longview, TX 75604; (903) 297-7814



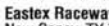
Comanche Trail RC Park, City Park, Big Spring, TX 79720; Allen Nichols, (915) 263-4241



Discount Hobbies, 1722A West Anderson Loop, Austin, TX 78757; Tony Bermudez, (512) 458-2324



Drycreek Raceway, 5903 Co. Rd. 2297, Quinlan, TX 75474; Micky Alphin, (903) 883-4060



Eastex Raceway, 45000 Hwy. 59 N., New Caney, TX 77357; Brent Mahaffy, (713) 399-9777



Fastrack Raceway, 301 Edith Dr., El Paso, TX 79924; Hector Gonzalez, fax (915) 779-4524



Finish Line Raceway, 2775 N. Hwy. 360, Ste. 637, Grand Prairie, TX 75050; Steve Manning, (817) 652-3340



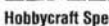
Flip & Spin R/C, 5957 Jones Rd., Bryan, TX 77807; Garland Crabb, (409) 822-7311



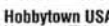
Hal's Hobby Raceway, 1440 Bessmer, El Paso, TX 79936; (915) 591-2213



The Hobby Center Raceway, 4104 Stan Schluter Loop, Ste. 1, Killeen, TX 76543; Lawrence Rernick, (817) 690-7311



Hobbycraft Speedway, 819 N. Main St., Corsicana, TX 75110; Keith Hoffman, (903) 872-6761



Hobbytown USA, 7676 FM 1960 W., Houston, TX 77070; Fred Pfatman, (713) 955-7097



Hobbytown USA, 999 E. Basse Rd., Ste. 177, San Antonio, TX 78209; Jose Sena or Clark Baisdon, (210) 829-8697; fax (210) 829-8707



Indy R/C World, 220 Saturn Rd., Garland, TX 75041; Steve Webster, (214) 271-4844; fax (214) 271-4502



Issac's Race Track, 18177 Gulf Frwy., Houston, TX 77598; Issac Ben-Ezra, (281) 488-8697



Keyser's Hobbies, 1643 Texas, College Station, TX 77840; Bill Bennett, (409) 693-8095



MBRC Off-Road Raceway, 204 D&E Valley Ln., Kennedale, TX 76060; Mike Battaille, (817) 563-1900



Mammoth R/C Racing, 4221 Spencer, Pasadena, TX 77504; John, (713) 946-2522



Mike's Hobby Shop Superstore and Raceway, 1605 Crescent Cir., Carrollton, TX 75006; (972) 242-4930; www.mikeshobbyshop.com



North Houston Speedway, 11847 Spears Rd., Houston, TX 77067; Bob or Carol Hillin, (713) 872-2471



North Texas 1/2 Scale Association, 3905 Sandia, Plano, TX 75023; Dean Densmore, (972) 519-0324



Performance Raceway, 1106C Witte Rd., Houston, TX 77055; Jorge Tabush or Terry Schmid, (713) 464-4458



Rev It Up Raceway Practice Track, 3076 Kellar Rd., Smithville, TX 78957; Rev. Alton T. Edwards, (512) 237-5903



Rick's R/C Raceway, 23B Scenic Loop, Boerne, TX 78009; Rick, (210) 981-2245 or Rich, (210) 590-1805



Rough Country, 905 Jacksboro Hwy., Wichita Falls, TX 76301-5310; Robert Kerr, (817) 322-2453



Star/C Raceway, 5802 Patton St., Corpus Christi, TX 78415; Glen Stead, (512) 949-8525; Race Hotline, (512) 881-6105



T&T Eagle, 161 W. Spring Creek Pkwy., #601, Plano, TX 75023; Tony Welborn, (214) 517-0562



Terminal Velocity R/C Raceway & Supply, 200 Wallington, Ste. 223, El Paso, TX 79902; Rick or Frank, (915) 534-9198



Texas Speedway, 6707 Chimney Rock, Bellaire, TX 77401



Tiger's Den R/C Speedway, 702 E. Broad St., Mansfield (DFW), TX 76063; Bob Burns, (817) 477-5513



T.O. Offroad Raceway, 6236 Quail, El Paso, TX 79924; Efrén Saenz, (915) 821-7522



Warehouse Radio Controlled Raceway, 5119 Plains Blvd., Amarillo, TX 79101; Craig or Darren Waddell, (806) 356-9080



W.E.S. Hobby Race, 780 S. Fourth St., Beaumont, TX 97701; Edmond Richards, (409) 839-4929



Wild Bill's Raceway, 535 E. Shady Grove, Irving, TX 75060; Lynn Morgan or Tom Nix, (214) 438-9224



UTAH

Intermountain R/C Raceway, 8481 W. 2700 S., Magna, UT 84044; David Mott, (801) 250-8303;



Payson R/C Raceway, 955 S. Main, Payson, UT 84651; Gus Wood, (801) 224-3852 and Lasca Wood, (801) 222-8677



Vision Hobby, 352 N. State St., Orem, UT 84057; Ken Rice, (801) 226-6226



WOR R/C Raceway, 3170 Brinker Ave., Ogden, UT 84401; Brian Worton, (801) 393-2530



VERMONT

Barre Town R/C Club, 14 S. Main St., Wall St. Complex, Barre, VT 05641; Russ Tribble or Pete Perreault, (802) 888-2860 or (802) 476-9458



Bradford R/C Racing, 101 St., Bradford, VT 05033; Seth Bean, (802) 222-9674



Stoughton Pond Raceway, Stoughton Pond Rd., Perkinsville, VT 05151; Rick Adams, (802) 263-9321



VIRGINIA

Brad's Hobbies, 1105 Greenville Ave., Staunton, VA 24401; Brad, (540) 885-3642



Brown Brothers Hobbies, 924 N. Main Street, Dumfries, VA 22026; Joel or Bob Brown, (703) 221-5746



Cooper's R/C Race Center, 4000 Sago Rd. (969), Chatham, VA 24531; Norris Cooper, (804) 724-7342 or (804) 724-4182



DRCW Raceway, Debbie's RC World, 2200 Commerce Pkwy., Virginia Beach, VA 23454; Les Modlin, (757) 340-6681



Gloucester Scale Hobbies, 2352 George Washington Memorial Hwy., Hayes Plaza, Hayes, VA 23072; Rob Thein, (804) 642-3484



Hampton RC Speedway, 1920 E. Pembroke Ave., Hampton, VA 23663; Steve Long or Mickey Kern, (757) 723-1884; website: www.fortunecity.com/olympia/norman/26/



Hobby Hangers Speedway, 14014 D Sullyfield Cir., Chantilly, VA 20151; Kwang or Billy, (703) 631-8820



The Hobby House, 116 Edds Ln., Sterling, VA 20165; Oppie, (703) 444-0333



K & W Hobby and Sports, 5186 Nine Mile Rd., Richmond, VA 23223; Ross Martin, (804) 737-3904



KC's Radio Control & Repair, Rt. 4, Box 312, Trents Ferry Rd., Lynchburg, VA 24503; Curtis or Kim Wright, (804) 384-8596



Olde Towne Hobby Shoppe, 9105 Center St., Manassas, VA 22110; Arnie Levine, (703) 369-1197



Race World Hobbies, 6102 Lakeside Ave., Richmond, VA 23228; Larry Boyd, (804) 553-8040



Roadmasters/Rick's Hobbies, 12201 Balls Ford Ave., Manassas, VA 22110; Rick, (703) 330-6833



Shamrock Raceway, 106 Cheviot Pl., Stephens City, VA 22655; Scott Janow, (540) 869-3551; note: track is located in Winchester, VA



Thunder Road RC Racing, P.O. Box 1022, Troy, VA 22974-1022; James Palmer, (804) 589-8174



The Tiltyard, 6994 Tiltyard Dr., Dayton, VA 22821; (540) 828-3476; www.tiltyard.com; tiltyard@rica.net



Trainlano R/C Racing, 5661 Shoulders Hill Rd., Suffolk, VA 23435; Frank Stevens, (757) 488-5454



WASHINGTON

Alfie's, 108 South K St., Aberdeen, WA 98520; (360) 533-6638



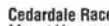
A-Main Raceway, 14011 N.E. 3rd Ct., Vancouver, WA 98685; Monty Coleman, (360) 571-8404



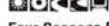
Burien Toyota R/C, 15025 1st Ave. South, Seattle, WA 98148; Ray Meek, (800) 654-6456



C&C Raceway, 266 Lind Ave. N.W., Renton, WA 98055; Charles Lakin, (206) 227-5167



Cedardale Raceway, 1673 Cedardale Rd., Mount Vernon, WA 98273; Joe Madonia, (360) 659-0072; email: getchell@halcyon.com



Four Seasons R/C Racing, 2941 Sleater Kinney Rd. N.E., Olympia, WA 98506; Gary and Sharon Brown, (360) 491-2430



Hank Perry Raceway, 1901 N. Sullivan Rd., Spokane, WA 99023; Thom Mullins, (509) 928-2009



Hannegan Speedway, 4212 Hannegan Rd., Bellingham, WA 98225; Dana Hoggarth, (360) 734-4090



Race City, 125 E. Main St., Auburn, WA 98002; Craig Haslebach, (253) 939-2515; trackside (253) 939-2515



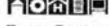
Schmidt's Auto Parts, 10305 Old Hwy. 99, Marysville, WA 98271; Jon Failia, (206) 653-8838



Spokane Indoor Raceway, 6422 E. 2nd Ave., Spokane, WA 99212; Dave Mapston, (509) 534-7434



Tacoma R/C Raceway, 6305 6th Ave., Tacoma, WA 98406; Scott Brown, (206) 565-1935



Tearor Raceway, Fantasy World Toy and Hobby, 7901 S. Hosmer, Tacoma, WA 98408; Dave Kleinman, (206) 473-6223



Ultimate R/C Raceway, 907 Cole St. #3, Enumclaw, WA 98022; Dan Daugherty, (360) 802-2388



West Coast Hobby & Raceway, 2239 Stevens Dr., Richland, WA 99352; Darren Shank, (509) 375-4995



Zep's Hobbies & Raceway, 530 Interlake, Moses Lake, WA 98837; Steve Ralph, (509) 765-8191



WEST VIRGINIA

Burr-Fab Raceway, 90 Davis St., West Union, WV 26456; Mark Travis, (304) 873-2487



Fulton's R/C Raceway, 2646 Chapline St., Wheeling, WV 26003; James Fulton, (304) 233-5355



Left Turn Hobbies, 100 Saco Ln. (by Post Office), Glen White, WV 25849; Stretch, (304) 255-3930



Race Zone, Hopewell Rd., Rt. 8, Box 343A, Fairmont, WV 26554; Joe Clutter, (304) 368-1000



WVRCA R/C Club, 142 W. Main, Bridgeport, WV 26330; D.W. Weed



WISCONSIN

ABC R/C Inc. & Raceway, 244 W. Main St., Waukesha, WI 53186; Dick Mathieson, (414) 542-1245



Gary's Hobby Center, 3701 Durand Ave., Racine, WI 53403; Bill Phalen, (414) 554-8884



Heart of the Valley R/C Club, 1330 Midway Rd., Menasha, WI 54952; Dick Morgan, (920) 954-1695



Central Coast ORRCC, EDSACC Sports Complex, Bateau Bay, NSW 2261;
Peter J. Knight, 61-43-693-698



Fast n' Fun, 250 Potreath Rd., Bellbrae West, Torquay, VIC 3228; Stephen Chara, 613 5266 1550 or 613 5266 1556; fax 613 5266 1556



Illawarra RCECC, Croome Sporting Complex, Albion Park Rail, NSW 2527; Mel or Andrew, 042-714-683



Lakeside R/C Racing Car Club, Hollywood Dr., Lansvale, NSW 2166; R. Bartolozzi, 62-2-907-9800



Melton Electric Circuit Car Association, Safeway Car Park, corner High St. and Coburns Rd., Melton, VIC 3337; Arthur Joslin, 61-3-9747-8805



Northern Districts Model Rally Club, Inc., Rear Stanford Centre, 16 Stanford Way, Malaga, Western Australia 6066; G. Thirwell, 61 (9) 249 3855; fax 61 (9) 249 4778; email tony@ois.com.au



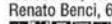
Penfield Park, DSTO Complex Salisbury, Adelaide, South Australia 5108; Trevor Unsworth, 618 8289-5010



R.C. Speedway, 259 King St., Newcastle, NSW 2060; Andrew Dillon-Smith, 02-49265966



Templestowe Flat Track Racers, Templestowe Reserve, corner of Porter St. and Williamsons Rd., Templestowe, Melbourne, Victoria 31066; Renato Benci, 61 (3) 9553 4625



Wodonga R/C Car Club, 11 Murphy St., Wodonga, VIC 3690; Ron Langman, 61-60-247-128



AUSTRIA

RMC-Wien, Aspernstrasse 5, Vienna, A-1220; Herbert Holze/Martin Hrzak, +43-664-4730376

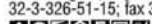


BELGIUM

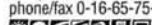
ATR-Alka-Tele-Racing, 3570 Stationstraat 21, Alken Limburg; 0032-11-25-49-03



Cartroubles Indoor Buggy Track, Jan Moonsstraat 52-56, 2160 Wommelgem; Guy Ermes, 32-3-326-51-15; fax 32-3-326-51-01



MBV-Kampenhout, Teniersln 28, Kampenhout B1910; Frank Mostrey, phone/fax 0-16-65-75-18



MRCZ, Centrum, De Burg; Montie, 75-71-63



Model Racing Club Oudenaarde, Scheldekant, 9700 Oudenaarde; A. Chanterle, 32-55-31-36-48; fax 32-55-30-19-12



R.C.R., Peilstraat 43, Retie 2470; A. Eelen, phone/fax 32-14-379685



BRAZIL

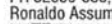
Amoc Cassociação de Modelismo B. Camborio, Junto ao Par Que Ecologico de Bal. Camborio, Bal. Camborio, S.C. 88.330-000; Leo Cesar, (047) 366-0001



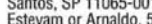
Brasília R/C Motor Circuit, Estacionamento do Estádio Mane Guaraninha, Brasília, DF 70000; Alexandre (Alex), 55-061-273-7205



C.A.A.R. Curitiba Associação de Automodelismo Radiocontrolado, Rua Theodoro Makioka, 2300 Santa Candida, Curitiba, PR 82650-530; Ronaldo Assumpcao, 55-41-354-2804



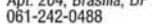
Electric Car Club R/C Santos, Av. Bernardino de Campos, 227, Santos, SP 11065-001; Estevam or Arnaldo, 55-013-232-2536



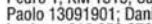
Hamilton Neto Associacao RC, Rua Uterere 259, Curitiba, Paran 80380-400; Danico Pilhax, 55-41-338-8041; hammer_usa@hotmail.com



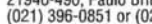
Hobby Center, SOS.210 B.L.H. Apt. 204, Brasília, DF 70.273; 061-242-0488



Hobby Planet Racing Club, Rod Dom Pedro 1, KM 1315, Campinas, Sao Paulo 13091901; Daniel, Helio, Luciano, 019 258 2768



Jungle Drive, Rua Alberto Maranhao, No. 219 Icha do Gov. Rio de Janeiro, 21940-490; Paulo Brito, (021) 396-0851 or (021) 393-7449



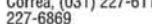
MP Raceway, Av. Nacoes Unidas, 6815 Lapa, Sao Paulo; Gerd Heitrotter, 55-11-9819039; www.hpraceway.com.br



Off Roaders, Av. Guilherme Dummont Villars, 317, Sao Paulo, CEP 05640; Waldir Ielpo, (055) 011-260-5628; fax (055) 011-831-4931



Way of R/C Off-Road Cerrado, Rua Paraiba 1323, 1st floor, Belo Horizonte, Minas Gerais; Claudio T. Corrêa, (031) 227-6111, fax (031) 227-6869

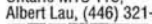


CANADA

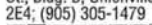
Action Wheelz, 462 Turcotte, Vanier, Quebec, G1M 1R6; Regent Tardif, (418) 527-5756.



Advance R/C Raceway, 4181 Sheppard Ave. E., Scarborough, Ontario M1S 1T3; Albert Lau, (446) 321-8377



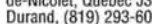
A&J Toronto R/C Raceway, 24 Main St., Bldg. B, Unionville, Ontario L3R 2E4; (905) 305-1479



The All New R.C. World, 2633 Hwy. #6, Mt. Hope, Hamilton, Ontario L0R 1W0; Dave, (905) 765-2301, Larry, (905) 333-3297 or Brian, (519) 752-0044



ATN, Auto Teleguidee Nicolet, 2000 Rue Paul Hubert, Saint-Jean-Baptiste-de-Nicolet, Quebec J3T 1E5; Louis Durand, (819) 293-6097



Auto Sprint, 6065 Des Grands Prairies, St. Leonard, Quebec H3G 2R6; David Kalayjian, (514) 287-3503



Blew Bye You Raceway, 134 Dike Rd., Chilliwack, British Columbia V2P 5B1; (604) 792-8978



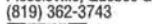
Circuit J.C., 1283 Chemin, St. Philippe, St. Polycarpe, Quebec J0P 1X0; Jean Castellon, (514) 265-3675



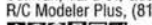
Circuit Pepsi, Centre de Location, 37 du Roi, Sorel, Quebec; (514) 746-8828



Circuit Plessis, 260 Rang 9 Ouest, Plessisville, Quebec G6L-2Y2; (819) 362-3743



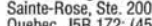
Circuit R/C Pro, 1500 Chemin Sullivan, Val d'Or, Quebec; J9P 1M1; R/C Modeler Plus, (819) 874-3918



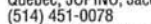
Circuit Teleguide St. Roch, 363-B St. Charles, St. Roch De L'Acigian, Quebec J0K 3H0; (514) 588-4254, fax (514) 588-6554



Circuit Teleguide Grand Prix II, 701, Sainte-Rose, Ste. 200, Laprairie, Quebec, J5R 1Z2; (450) 444-1286



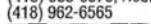
Club Auto Teleguides, 1750 Mlee Interpave, C.P. 35, Pointe-Fortune, Quebec, J0P1N0; Jacques St. Alevis, (514) 451-0078



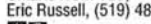
Club Avatt, 244 Jules-Richard, Deauville, Quebec J1N 3; Daniel Vanier, (819) 864-6262



Club RCSI, 44 Rue Holiday, Sept-Iles, Quebec G4R; Sylvio Gerard, (418) 968-6575; Hobby Shop, (418) 962-6565



CRCCC, Box 309, Clinton, Ontario N0M 1L0; Eric Russell, (519) 482-9429



CTG, 450 Chemin de la Grand Ligne, Granby, Quebec; (514) 358-4419



CTL, 495 Industriel, Longueuil, Quebec; (514) 358-4419



Dustkickers R/C Raceway, 1785 Cypress Rd., Quesnel, British Columbia V2J 4B1; Darrell Dinsdale, (250) 747-2680



Dynamic Hobbies, 21 Concourse Gate, Unit 6, Nepean, Ontario, K2E7S4; Clark Freeman, (613) 225-9634



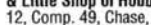
East Coast Model Center Raceway, 13 Glen Stewart Dr, Ste 1, Southport, Prince Edward Island C1A 8X9; Gary Stephen, (902) 569-3262



Fast-Trax Speedway, RR 4, Trenton, Ontario; Russ McPeak, (613) 394-6411



Fly'n Bryan's Radical Raceway & Little Shop of Hobbies, RR #1, Ste. 12, Comp. 49, Chase, British Columbia V0E 1M0; Bryan Coffey/Dani Potvin, (604) 955-0669



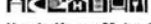
Gilles Comtois, 1458 Boul. Lafleche, Bale-Comeau, Quebec G5C 1E1; (418) 295-1830



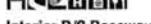
Hobby 2000, 75 St.-Jean-Baptiste, Ste. 140, Chateaugay, Quebec J6J 3H6; Hugues-Andre Meloche, (450) 698-2000



Honda House Motor Speedway, 384 Richmond St., Chatham, Ontario N7M 1P9; John Elliot, (519) 354-5530



Interior R/C Raceway, 34-1605 Summit Dr., Kamloops, BC, V2E 2A5; Martin Vannieuwenhuizen, (604) 374-1268 or (604) 374-8458



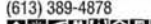
J-T International Raceway, 127 Milligan Ln., Nanapan, Ontario K7R 8A1; N. O'Neill, (613) 354-0099



Leading Edge R/C Speedway, 731 Gardiners Rd., Kingston, Ontario K7M 3Y5; Mike and Tony Daicar, (613) 389-4878



Mid-Canada R/C Speedway, 216 Hutchings, Winnipeg, Manitoba R3H 0L3; Richard Driedger, (204) 339-6566



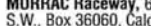
Miniatures & Passions, 204 St. Charles, #103, Ste. Therese, Quebec J7E 2 B4; Gilles Lachance, (514) 979-7989



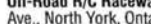
MORRAC Raceway, 6449 Crowchild Tr. S.W., Box 36060, Calgary, Alberta T3E 7C8; (403) 254-1386



Off-Road R/C Raceway, 76 Eddystone Ave., North York, Ontario M3N-1H4; Ron Lefebvre, (416) 740-0536



Prince George Radio Controlled Car Club, 202 Explorer Cres., Prince George, B.C. Y2M5R8; Doug Waller, (604) 561-0035



Quintrax Speedway, 610 Dundas St. East, Belleville, Ontario K7K 2M1; (613) 962-1414; fax (613) 962-7306



Randy Shantz Raceway, 1015 W. 14th St., North Vancouver, British Columbia; Steve Mullah, (604) 945-3888



R/C Champ Raceway, 670 Progress Ave., Rear Unit #13-16; Scarborough, Ontario M1H 3A4; Ben, Matthew or Louie, (416) 289-8717



Recreation R/C Raceway, Hwy. 16 and Ferry Ave., Prince George, BC; Doug Waller, (604) 561-0035



Ronbo's R/C Racing, R.R. 1, Glen Walter, Cornwall, Ontario K6H 3G4; Ron Giroux, (613) 936-0176



Rousillon Hobby Track, 177-D St. Jean Baptiste, Chateaugay, Quebec J6K 3B4; (514) 698-2151



Shadetree Raceway, R.R. #4, 22566 Stage Rd., Thamesville, Ontario; Darrin Charbonneau, (519) 692-5211



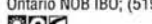
Snye Wreck RC, R.R. #1, St. Regis, Quebec H0M 1A0; Aimee Mitchell, (613) 575-2496



South Muskoka R.C. Track & Mini Putt, 8903 Hwy. 11, Orillia, Ontario L3V 6H3; Justin Fortin, (705) 329-0397



Spinnin Wheel Raceway, RR 1, Ariss, Ontario N0B 1B0; (519) 824-1614



South Okanagan Roadhogs, Skha Lake Rd., Penticton, BC; Willie Lemm, (604) 492-5698



Steeltown Speedway, 3580 Kirk Rd. West, Binbrook, Ontario L0R 1C0; Paul Snyder, (905) 227-7508



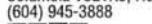
Sudbury Organized Auto Racing, 765 Barrydowne Rd., Sudbury, Ontario P3A 3T6; Ken Moore, (705) 524-5339



Thunder Alley Raceway, Lambton Mall, 1380 London Rd., Sarnia, Ontario N7S 1P8; Rob Smith, (519) 882-3361

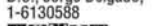


Vancouver R/C Road Racers, #100-2733 Barney Hwy., Coquitlam, British Columbia V3E1K9; Roger Brown, (604) 945-3888

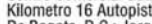


COLOMBIA

Club De Automodelismo Colombiano, Centro Recreativo Cafam, Kilometro 14 Autopista Norte, Santafe De Bogota, D.C.; Jorge Delgado, 1-6130588



Club De Automodelismo Colombiano, Centro Comercial Guaymaral, Kilometro 16 Autopista Norte, Santafe De Bogota, D.C.; Jorge Delgado, 1-6130588



Garoso Raceway, Avenida Libertadores con Diagonal Gran Colombia, Cucuta; Gabriel Rodriguez, 975-751892



CYPRUS

Racing Model Club, Kennedy Ave. N. 42, Nicosia; Andrea Sotiriou, 493186; fax 493229

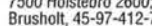


DENMARK

Brondby Motor Club, Roskildevej 460 Brondby 2605; Soren Boy Holst, 45-36-472-462



Holstebro R/C Buggy Club, Mozartsvej 7500 Holstebro 2600; Michael Brusholt, 45-97-412-734



Klub 144 Raceway, Bagsvaerdvej 144A, 2800 Lyngby; Henrik Carstens, 45-42-88-3691



Rainbow Raceway, Eriksvej 9 Glostrup, Copenhagen 2600; P. Christiansen, 45-52-848-504



Thor Minirace Odense, Sohusevej 255, Allose, Odense, behind Alesso Hallen (Sport Centre), Odense; Ulrich Rasmussen, 45-65-303-707



DOMINICAN REP.

Adoca R/C Speedway, Feria Ganadera, Santo Domingo; (809) 220-5266



La Barranquilla R/C International Speedway, Santiago; (809) 582-2303



ECUADOR

Hobby Centro A.C.R.O. Club, Via a Turi Km O.S., Cuenca-Ecuador; Teddy Jaramillo, 593-7-831-289; fax 593-7-817082



ENGLAND

Chessington Radio Car Club, Surbiton Sport Club, Riverhill Estate

GREECE

EDRA-Fanatix Racing, 20 Irinis Ave.,
Pefki, Athens, 15121;
Mr. T. Diamandakis, 8025556
☎☎☎☎☎

GUAM

R/C International Raceway,
P.O. Box GK, Agaña; Robert (Buddy)
Simpkins, (671) 477-3207
☎☎☎☎☎

HONDURAS

Autodromo Accion, Quinta Santa
Maria, San Pedro Sula, Colonia Rivera
Hernandez; Eduardo Hondal,
(504) 52-2061
☎☎☎☎☎

HONG KONG

ACO Racing Track, Mt. SS Cheng, M.W.,
Ping che, Fanling,
(852) 2370-0723
☎☎☎☎☎

Kingsville Buggy Arena,
Wong Chuk Yeung Village, Shatin, N.T.;
Pak Yeung, (852) 607-0828
☎☎☎☎☎

INDONESIA

1st Circuit, Kompleks Villa, Kalijudah
Indah, Surabaya; 62-31-5681965
☎☎☎☎☎

Cipaku Indah Speedway, J1 Cipaku
Indah II/2, Bandung 40143; Cipaku
Indah Hotel, Erwin Lewi, 62-22-218-228,
fax 62-22-210-223
☎☎☎☎☎☎☎

Karinda Off-Road R/C Car Model
Circuit, Perumahan Bumi Karang Indah,
J1 Karang tengah Rayam lebak bulus,
Jakarta-Selatan 12440; Winiwed W.
Soedarmadi, 62-21-7900878
☎☎☎☎☎☎☎

Pondok Cabecircuit, J.L. Kunir No. 83,
Pondok Cabe, Ciputat, Jakarta; Ali Agus
Salim, 7403568-9; fax 7491533
☎☎☎☎☎☎☎

Sentul World Hobbies,
Citeureup Bogor Jawa Barat;
International Circuit Hilton Hartanto, Ian
Sentul International Sirkuit,
KM 42 62-21-751-2439
☎☎☎☎☎☎☎

ISRAEL

Ircca Off-Road, Rahanana;
Yaron Zafris, (972) 030549937
☎☎☎☎☎☎☎

Nahshoneat, Abba Nilel Silver Str. 64,
Haifa 32809; Golan Levy,
(972) 039386444 or (972) 04231252
☎☎☎☎☎☎☎

ITALY

Associazione Modellisti Cossato,
via P. Maffei, Cossato 13014, Biella;
Zanellato Romildo, 015-405881;
fax 015-922709
☎☎☎☎☎☎☎

Yokota R/C Racers, PSC #78, Box 3889,
APO AP 96326, Tokyo; Donnie Leornas,
011-813-11-757-2012
☎☎☎☎☎☎☎

Zama Off-Road Raceway,
17th ASGCM Unit 45013, Box 3232,
APO AP 96338; SFC Ken Campbell,
81-3117-63-8478
☎☎☎☎☎☎☎

JAPAN

Xiwakuni R/C Track,
PSC 561, Box 978, FPO AP 96310-0978;
David T. Eck, 81-6117-53-3662
☎☎☎☎☎☎☎

Yokota R/C Racers, PSC #78, Box 3889,
APO AP 96326, Tokyo; Donnie Leornas,
011-813-11-757-2012
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17th ASGCM Unit 45013, Box 3232,
APO AP 96338; SFC Ken Campbell,
81-3117-63-8478
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KUWAIT

Inferno DX 4WD Track, P.O. Box 9167,
Ahadi 61002; Yousuf Acqatari
☎☎☎☎☎☎☎

LEBANON

Wild Willy RCC, Oscar St-Jal Eddie,
Beirut; 00961-4-403751
☎☎☎☎☎☎☎

MALAYSIA

Titiwangsa Raceway, Lot 128,
Ampang Park, Shopping Centre,
Jalan, Ampang, Kuala Lumpur 50450;
R.A.C.E. Sdn Bhd., 03-2614496
☎☎☎☎☎☎☎

MEXICO

Alces Off Road, Lopez Mateos y
Rayon S/N, Ensenada, Baja California,
BC 22830; Jorge Bustamante,
667-6-1476, 61477, 86729
☎☎☎☎☎☎☎

Baja Jr., H. Valdez 151 Pte. Y Gmo.
Prieto, Los Mochis Sinaloa 81200;
Memo Asencio, Gaby Macias,
681-20276; fax 681-26430
☎☎☎☎☎☎☎

Club Kyosho de Automodelismo
Departino, Av. Pacifico 216
Coyoacan; Ajusco-Toluca Km
15.3 DF 04330, Ing. Jorge Perez
Holder, 525-544-08096;
fax 525-544-7133
☎☎☎☎☎☎☎

Cinamo Coca-Cola,
Ruiz Cortines 620 Col. Central de
Carga, Guadalupe, Nuevo Leon 67120;
Sergio Garza, 83-35-70-09/79-32-33
☎☎☎☎☎☎☎

Hobby Centro, 12 De Diciembre No.
3070-A, Guadalupe, JAL 45550;
Alejandro Ortiz Del Toro, 36-21-46-28
☎☎☎☎☎☎☎

Hobby's Formula, Au observatorio
457 DF 01120; 905-502-3620
☎☎☎☎☎☎☎

Hobby Model's Raceway,
Blvd. Garcia de Leon, 1555, Morello,
Michoacan 58260; 431-5-01-22
☎☎☎☎☎☎☎

Jaguar R/C Club, Calz. Zavaleta 116,
Puebla 72150; Chema, Denisse or
Chiro, 22-31-00-91, 22-33-00-94
☎☎☎☎☎☎☎

La Hielera, Prol Corregidora Nte 350,
Queretaro, QRO C.P. 76160;
Jorge Morelos Rabell, 42-12-15-25
☎☎☎☎☎☎☎

Pista Casino, Hotel Casino de la
Selva, Cuernavaca, Morelos 16507;
Luis Duhart, 73-19-12-38
☎☎☎☎☎☎☎

R/C Racing Club, Obsidiana #2900,
Zapopan, Jalisco 44560;
Fernando Hernandez, 3-616-73-47
☎☎☎☎☎☎☎

Tony's Track,
Obregon 364 Sur, Culicán Sinaloa;
Guillermo Prieto, 67-165708-168141
☎☎☎☎☎☎☎

NETHERLANDS

H.F.C.C. Hollandia, De Weir 60, The
Hague;
G. de Jong, 031-070-3679820
☎☎☎☎☎☎☎

M.A.C. Vlymen, Hendriklaan 6,
Vlymen;
Ju Kasteren, 31-73-517906
☎☎☎☎☎☎☎

NEW ZEALAND

Capital Model Racers, Avalon,
Lower Hutt; Roger Whitmarsh, 04-
566-5714
☎☎☎☎☎☎☎

Counties R/C Raceway, Pukekohe
Showgrounds, Station Rd.,
Pukekohe,
R. Northcott, 09-23-86904
☎☎☎☎☎☎☎

Harewood Radio Control Car Club,
550 Sawyers Arms Rd., Christ
Church; Dean Johnson,
09-0-3880 344
☎☎☎☎☎☎☎

Papakura Indoor R/C Car Club,
25 Tainere Cres., Papakura, Auckland;
Colin Perry, 09-298-4711
☎☎☎☎☎☎☎

Western District R/C Off-Road Car
Club, CNV Bancroft/Akatea Drive,
Auckland; Chris, 09-838-5201
☎☎☎☎☎☎☎

NORWAY

Aurskog R/C Club, Aursmoen, 1930
Aurskog; Tommy Gjeleseth,
47-63-86-21-61
☎☎☎☎☎☎☎

Dalen Raceway,
P.B. 728, 6401 Molde;
Johnny Reitan, 94 64 52 95
☎☎☎☎☎☎☎

Hadeland Raceway,
2750 Gran, Gran;
Dag Bakke-Nilssen, 61330405
☎☎☎☎☎☎☎

Store-Baller Raceway,
2750 Gran, Gran;
Ola Raastad, 61330225
☎☎☎☎☎☎☎

PHILIPPINES

Boyer R/C Hobby Shop, Unit No. 10
Lucas Commercial Center, Marcos Hwy.,
Decembaromot, Antipolo, Rizal; Jose
"Boy" Chua, 721-2555
☎☎☎☎☎☎☎

Philippine F1/Touring Club,
Super Mall I, EDSA, Quezon City 1156;
Raymond Aguilar/Ron Villafior,
896-64-15/23-30-08
☎☎☎☎☎☎☎

Philippine R/C Association,
B.F. Homes Paranaque,
Metro Manila 1700;
Ronald/Manny Villafior, 23-30-08
☎☎☎☎☎☎☎

Quezon City Radio Control Club,
Quezon City Memorial Cir., Quezon City;
Benjie Lumanlan, 731-94-53
☎☎☎☎☎☎☎

PORTUGAL

Aero Clube da Madeira, Rua do
Castanheiro E-2, Funchal, Madeira;
fax 091-221265
☎☎☎☎☎☎☎

SOUTH AFRICA

Banana County R/C Racing Club,
P.O. Box 988, Margate, 4275;
Dennis Steenmans, 27-0-391-20975
☎☎☎☎☎☎☎

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Chris's BACK LOT

The opinions expressed on this page do not necessarily represent the opinions of the entire Car Action staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. My email address is: chris@airage.com.

BY CHRIS CHIANELLI

The Beautiful Raceway Award

I received a number of emails from readers complaining about how their parents won't let them build an "ugly" racetrack in the backyard. If a similar obstacle stands between you and your dream home raceway, show your parents these photos sent in by Scott Stewart of Grafton, WI.

Scott states, "An off-road track can be blended into a yard and actually enhance it." To make the track "blend," as he puts it, on the perimeter of the track, Scott placed trees, pine shrubs, groomed sections of lawn, flowers and even a few garden benches.

Scott and his girlfriend have lots of racing fun any time they want without having to drive to the local track, which probably isn't all that "local" because they live in rural Wisconsin. To hold up her end, it's Scott's girlfriend's job to keep the track weed free. But, as she puts it, "The upside is less grass to mow." I'd say Scott has a great deal!

While it appears Scott used his entire backyard for the track (the main straight is 85 feet), leaving no yard with which to blend, from his letter, it seems he has a rather larger backyard than these photos indicate. Anyway, remember, there is no set size for a racetrack. No matter how



Top: I know this stand looks expensive, but Scott's brother-in-law is in the fiberglass business. Anyway, there are a lot of other things—a wooden picnic table, for example—that can serve as a drivers' stand. **Above:** there's really nothing expensive here. Scott's main ingredients are flexible pipe, landscaping spikes and dirt brought in to give the track surface its shape. The track features a tabletop bordered by stones, a medium jump, double jumps, triples and various banked turns, including a banked bowl turn. **Left:** from this view, it appears that a more conventional yard exists behind the other half of Scott's house. **Below:** a few sections of inexpensive garden hose fastened to agricultural disks with plastic tie-wraps make Scott's on-road race-track. The best part of this setup is that cars can be driven into and out of the garage right over the layout with no problem.



big or small, the wheel-to-wheel racing action is equally exciting.

To round out his home race haven, Scott and his girlfriend race Tamiya F1 cars and sedans on a track that can be set up or broken down in a matter of minutes in his driveway.

So if your local track is 45 minutes away, be resourceful like

Scott and bring the racing home. And if your parents are resistant, strike up a deal: tell them if you get your racetrack, they'll get an awesome flower bed out of the deal with a long-term maintenance agreement. Isn't it worth racing anytime you want?



Left: don't worry! The garden you offer up to your mom as a bribe doesn't have to be this awesome. Scott seems to do everything on a large scale—big, beautiful track ... big, beautiful garden! They have too much space in Wisconsin.



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